

Engineering  
Library

GENERAL LIBRARY  
MAY - 8 1920  
UNIV. OF MICH.

V

# THE ARCHITECTURAL FORUM



APRIL  
1920

---

Single Copy Sixty Cents   ROGERS AND MANSON CO., PUBLISHERS   Six Dollars the Year

# CYPRESS

*"The Wood Eternal"*

ESPECIALLY ADAPTED TO  
THE HOSPITAL KITCHEN

Cypress is dependable for long life and good behavior as interior trim for buildings. For the hospital kitchen it is adapted as though Providentially made for the purpose.

It stands the steam and heat, the changes from wet to dry and remains staunch and true.

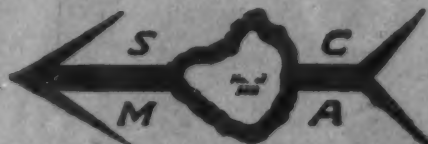
The grain is handsome and stays and it takes a most beautiful finish. ALTOGETHER THIS QUESTION OF WHICH WOOD FOR A GIVEN USE IS WORTH LOOKING INTO. Our "Architects' Helps Department" is at your service with reliable counsel, favoring Cypress *only when* Cypress should be used *for your sake*.

## Southern Cypress Manufacturers' Association

1234 Hibernia Bank Bldg., New Orleans, La., or 1234 Heard National Bank Bldg., Jacksonville, Fla.

### CUTTING TABLES

Write us for  
the Standard  
Recipe for  
Black Stain  
on Cypress



TRADE MARK REG. U.S. PAT. OFFICE

Buy by the Cypress Arrow which is stamped on each piece or each bundle. It identifies your purchase as true "Tidewater" Cypress.

### CUTTING TABLES

Write us for  
the Standard  
Recipe for  
Black Stain  
on Cypress





# THE EDITORS FORUM



## MATERIALS OF MADISON SQUARE PRESBYTERIAN CHURCH USED IN NEW BUILDING

THOSE architects who so keenly regretted the passing of that little gem of modern architecture, the Madison Square Presbyterian Church, which was probably the masterpiece of the late Stanford White, may take some consolation in knowing that the beautiful materials and detail with which it was ornamented still live, though in a totally different composition than the original.

It was a distinctly happy thought that occurred to Donn Barber to make use of these gorgeous materials in a building at Hartford, Conn., located in a commanding position, and which otherwise, because of present stringent conditions, would have been required to join the ranks of what we ordinarily term "utilitarian architecture." The problem of shaping a fixed quantity of material into a new façade was in itself a severe task, and Mr. Barber is to be congratulated on the ingenuity which he displayed in developing a building under such unusual and difficult circumstances.

## COMPETITION FOR THE REMODELING OF A NEW YORK CITY TENEMENT BLOCK

THE acute housing conditions which prevail in all large centers have directed attention for many months to means of affording relief that can be worked out practically under the distressing economic situation prevailing to-day. New York City is undoubtedly suffering to a greater extent than any other city of the country, and the officials who are aware of the actual existing conditions are unable to offer any hope of improvement, because there is but a pitiable amount of new construction under way or even contemplated that will aid the class of people most in need of help, because of the high building costs and the difficulty of obtaining the necessary financing.

The Reconstruction Commission of the State of New York has given considerable study during the past few months to the housing problem, and the most tangible result of its efforts is the suggestion that the many old law tenements in the lower part of New York City which are now largely uninhabitable be made over to afford wholesome, light, airy, sanitary places in which to live. This undoubtedly offers the most feasible method of securing an appreciable amount of living accommodations at a cost that would not make rents prohibitive and thus defeat the ends sought.

Most of the defects of the old tenements are due to poor planning. Their value not only in terms

of better living conditions, but also as a financial investment, would be enhanced if they were properly planned. All of these buildings were erected previous to the enactment of the Tenement House Law nineteen years ago. Since then great progress has been made in the planning of tenement and apartment houses, and it is now conclusively proved that much greater space can be allowed for courts without decreasing the net rentable area if modern planning principles are followed.

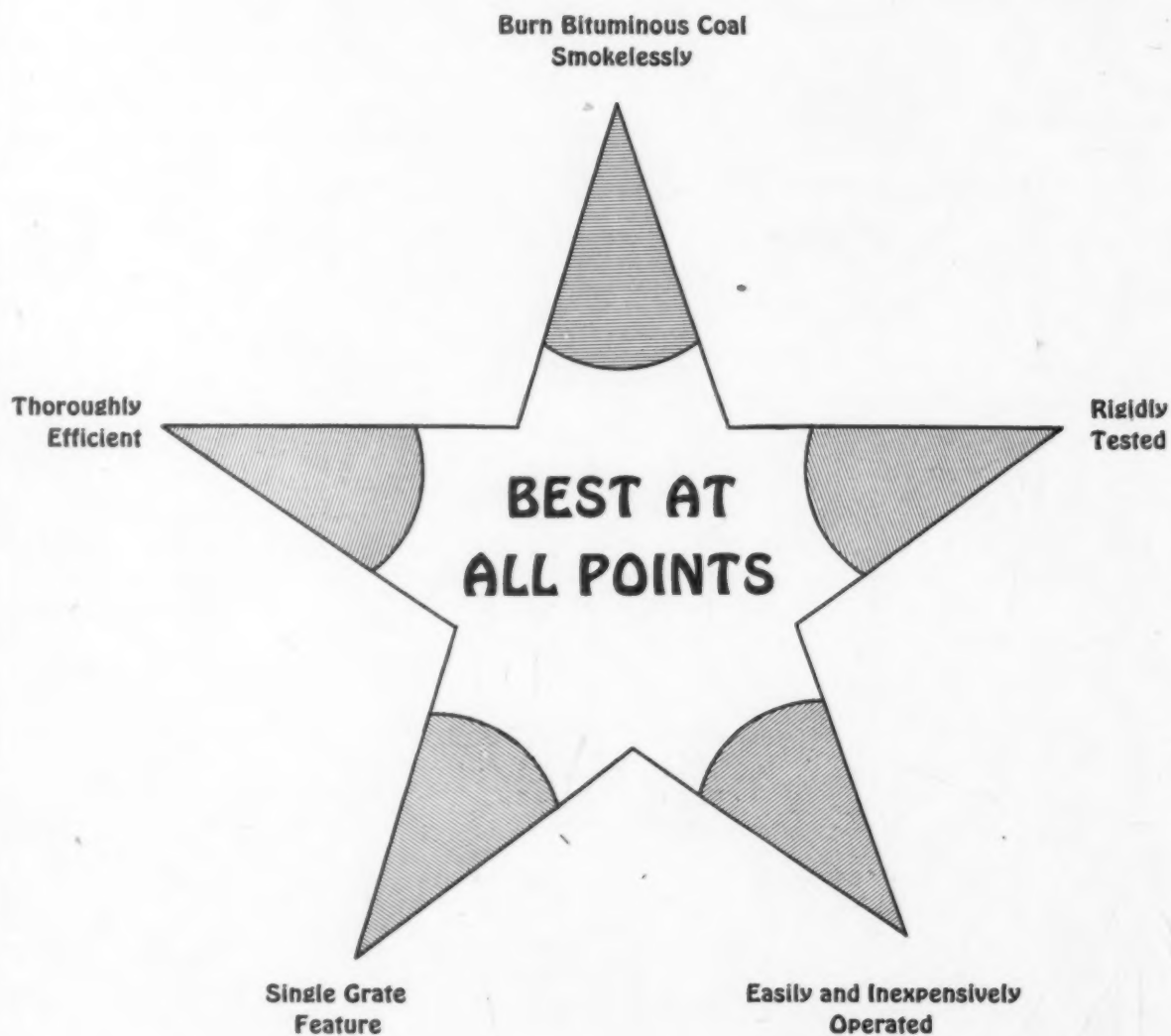
The benefit that would come to the housing situation in New York if these tenements were remodeled, can be seen in the fact that out of a total of 982,926 individual apartments in March, 1919, 587,851 were in old law tenements. It might be expected that in the usual course of events they would be replaced with modern structures, but in the ten years ending March, 1919, only 58,552 apartments were destroyed. At this rate it would take one hundred years for the last of these buildings to disappear.

The Reconstruction Commission, in conjunction with the Joint Legislative Committee on Housing, has instituted a competition for the study of a typical block of old law tenements in New York City to obtain suggestions for remodeling them into decent living quarters at a moderate expense. It is hoped the competition will produce the best method of improving living conditions without destroying the buildings, and suggest a plan of remodeling that will encourage such alterations by the demonstration of its economic wisdom. The relation of costs to results obtained will be a predominating factor in determining the judgment. For the purpose of the competition the block bounded by Rutgers, Madison, Jefferson and Monroe streets, on the lower east side, has been selected. Any person is eligible to compete. Competitors will be furnished with two plans of the block, one of the ground floor and the other a typical floor, and the elevations of the four street fronts. Only two drawings are required,—the revised plans of first and typical floors,—but an additional drawing showing a bird's-eye perspective may be submitted at the option of the designer. The competition will close on June 15, 1920, and drawings should be delivered at Room 302, Hall of Records, New York City. A total of \$5,000 will be awarded in prizes: two of \$1,000 each, four of \$500 each and four of \$250 each. Further information and copies of the program may be had by addressing Clarence S. Stein, Secretary, Housing Committee, Reconstruction Commission of the State of New York, Room 302, Hall of Records.

# CAPITOL BOILERS

## SMOKELESS TYPE

---



*UNITED STATES RADIATOR CORPORATION*

GENERAL OFFICES: DETROIT, MICHIGAN

BRANCH OFFICES IN PRINCIPAL CITIES







PENCIL SKETCH OF A  
DESIGN FOR A MEMORIAL  
BY O. R. EGGERS

# The ARCHITECTURAL FORUM

VOLUME XXXII

APRIL 1920

NUMBER 4

## Branch Offices of State Banks in Detroit

By JOHN M. DONALDSON, F.A.I.A.

THROUGH my friend, Mr. X, the President of one of the largest State Banks in Detroit, I learn that the growth in deposits and in volume of accounts in the branch banks of the downtown State Banks of Detroit has been the subject of much interest and comment in financial circles of other large cities.

Records show that the deposits in many of these branch banks greatly exceed those of the average small city or country banks.

It has been demonstrated in Detroit that through the offices of the branch banks the merchant and manufacturer can obtain all of the services of the downtown office, including loans, payrolls, etc., and that the wage-earner and good wife can in them find safe and convenient depository for savings in their home vicinity, and thus save time that would otherwise be required in going downtown and often waiting in line at the main bank.

The first branch banking office in Detroit was inaugurated about thirty years ago, but they did not come into general use until within the last fifteen years with the rapid growth of Detroit, which brought to the city a great population of foreigners, most of whom knew nothing about savings banks.

The establishment of branches which brought to the homes and shopping centers the strength and the facilities of a great

downtown bank has doubtless encouraged savings and prevented the multiplication of weak and irresponsible neighborhood banks.

Much money has thus been accumulated and utilized in the upbuilding of Detroit, which would otherwise have been kept out of circulation.

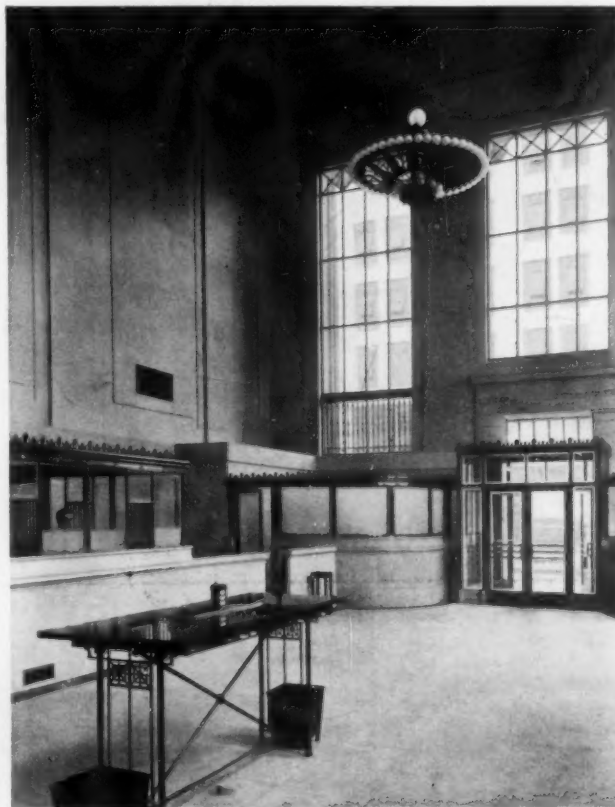
These savings have been used to the great advantage of the community in financing the enormous home building operations of this city.

The success of the branch banks of Detroit is beyond question, and in the later years many well designed and fully equipped banking offices have been built to meet the demands of increased trade and competition.

It is the general practice to carry loans, mortgages and collaterals, as well as reserve cash, in the strong vaults of the main offices, as this makes for a simple accounting system; but the branch manager through a private wire communicating system can furnish as rapid service on loans as the main office.

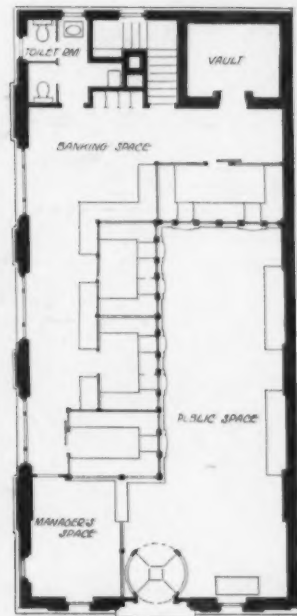
The equipment and office conduct of the branch office does not differ, except in degree, from that of the main banking office.

In large industrial cities where community centers are naturally developed, the larger banks find it good business to bring the banking facilities to the people, and in so doing they have served not only their interests but those of the people.



Interior, Wayne County and Home Savings Branch Bank, Detroit  
Albert Kahn, Architect





Exterior and Floor Plan, Dime Savings Bank, Fourteenth Avenue and Ferry Park Boulevard, Detroit  
Smith, Hinchman & Grylls, Architects

It is the experience of the Detroit banks that most satisfactory results are assured by the establishment of branch banking offices in individual buildings located in the shopping districts contiguous to the homes of the workers, rather than in the manufacturing centers themselves.

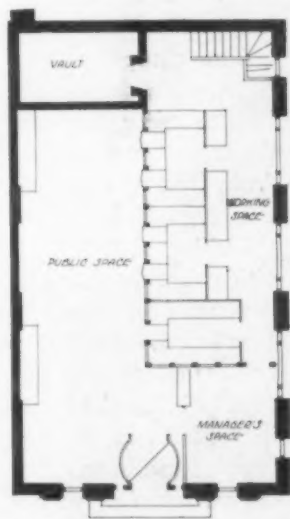
The branch bank buildings are usually of brick and stone, fireproof construction, with a story height from 16 to 18 feet.

It has been found that in such a building as above described deposits must exceed \$300,000 in amount to carry the necessary costs.

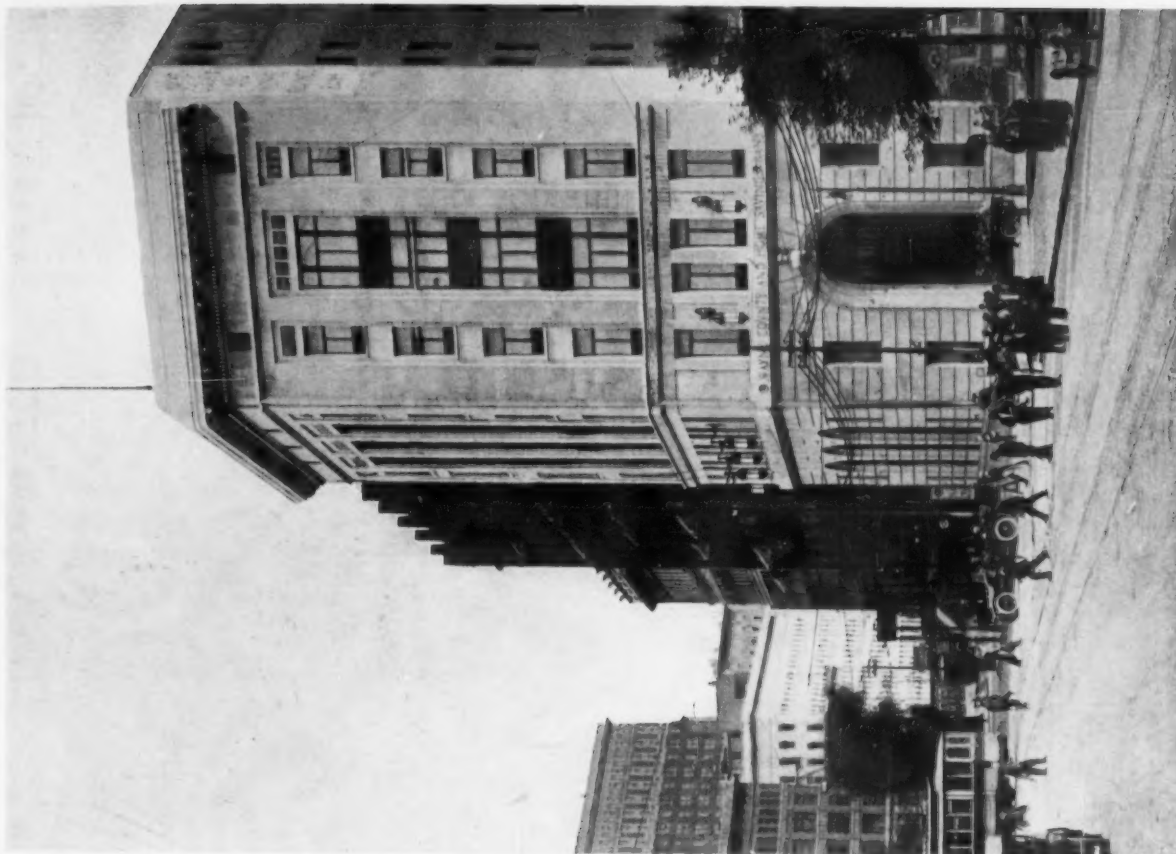
Certain of the branch banks favorably located

in Detroit have deposits ranging from \$2,000,000 to \$4,000,000.

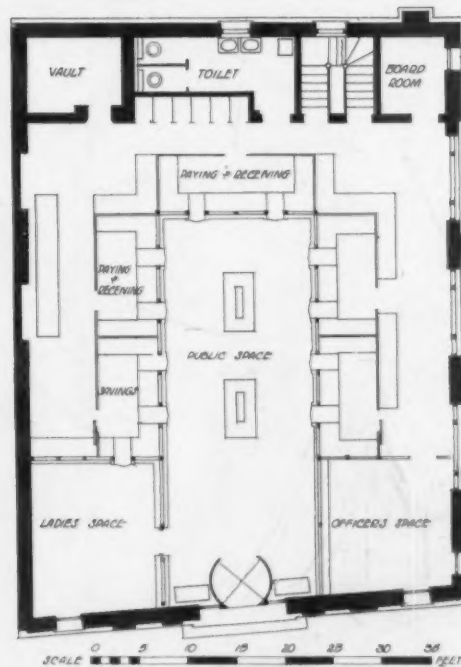
The State Banking Laws of Michigan do not permit more than 50 per cent of the capital stock of State Banks to be invested in buildings and real estate, and this restriction naturally operates against extending branch bank buildings beyond the specific requirements of banking service. Then, too, it is felt that an individual building is a distinct asset, even at an added first cost.



Floor Plan and Exterior, Dime Savings Bank, Grand River Boulevard, Detroit  
Smith, Hinchman & Grylls, Architects



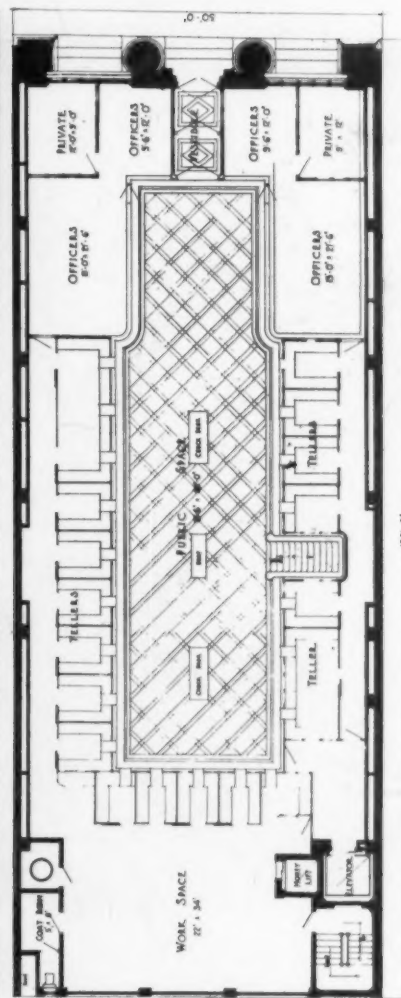
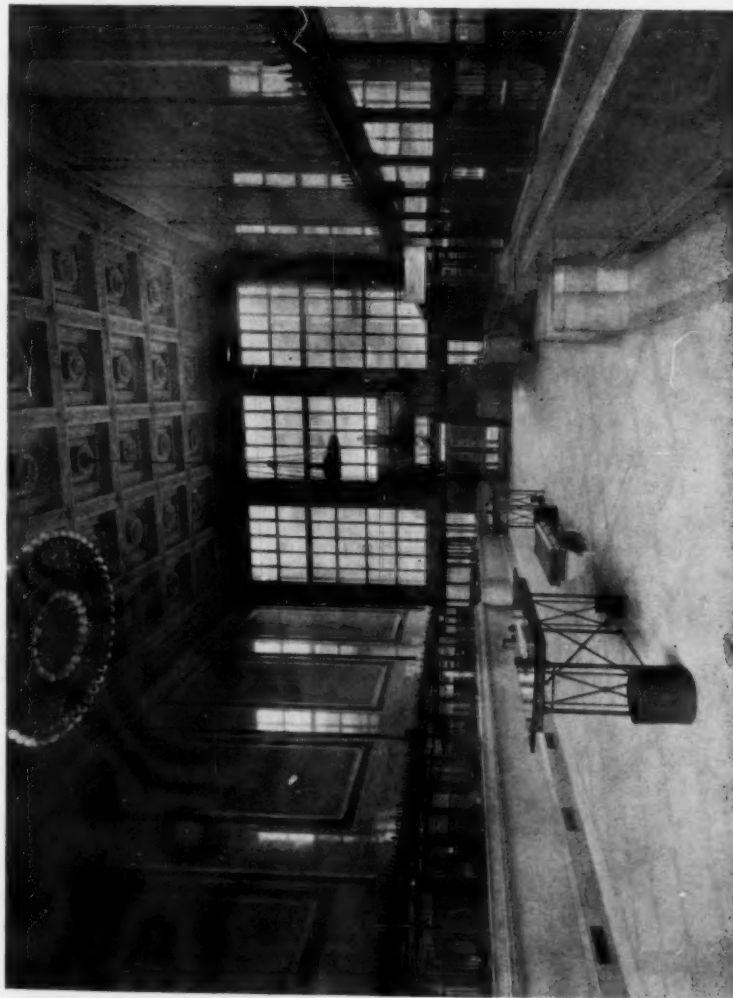
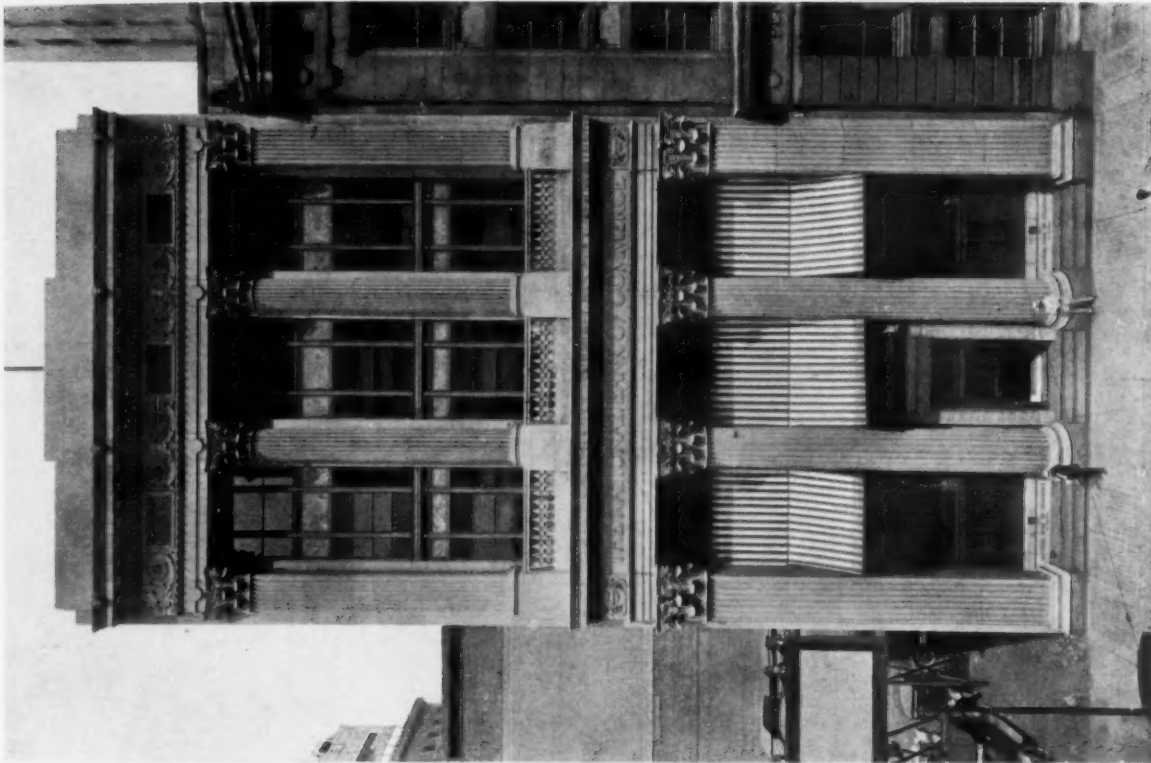
MAIN BUILDING, WAYNE COUNTY AND HOME SAVINGS BANK, DETROIT, MICH.  
DONALDSON & MEIER, ARCHITECTS



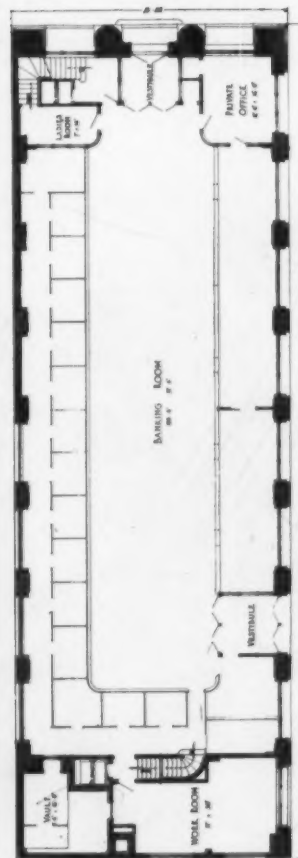
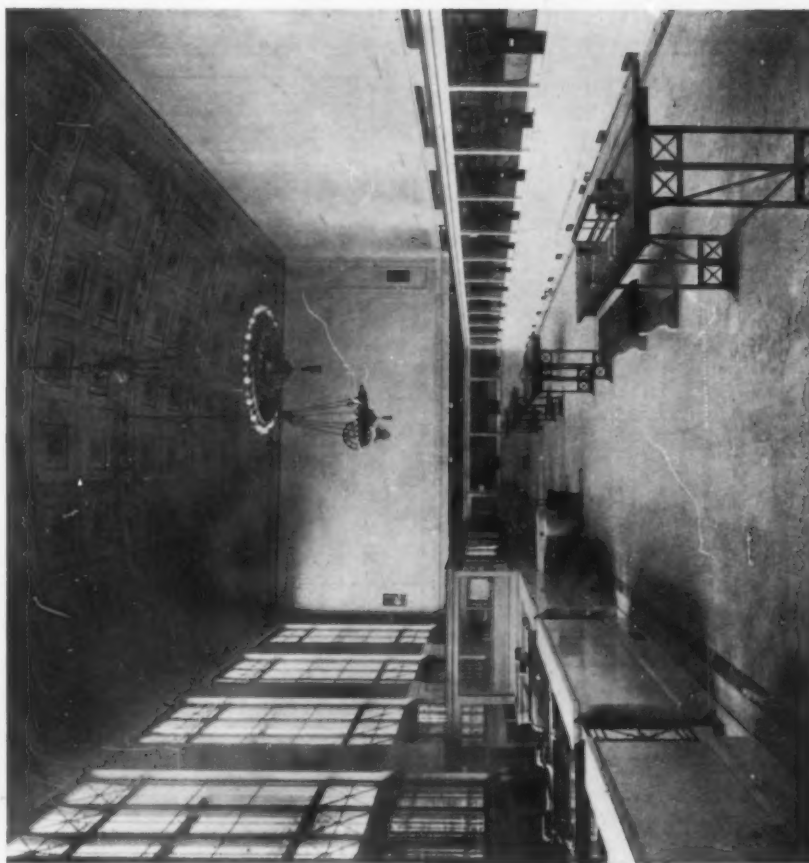
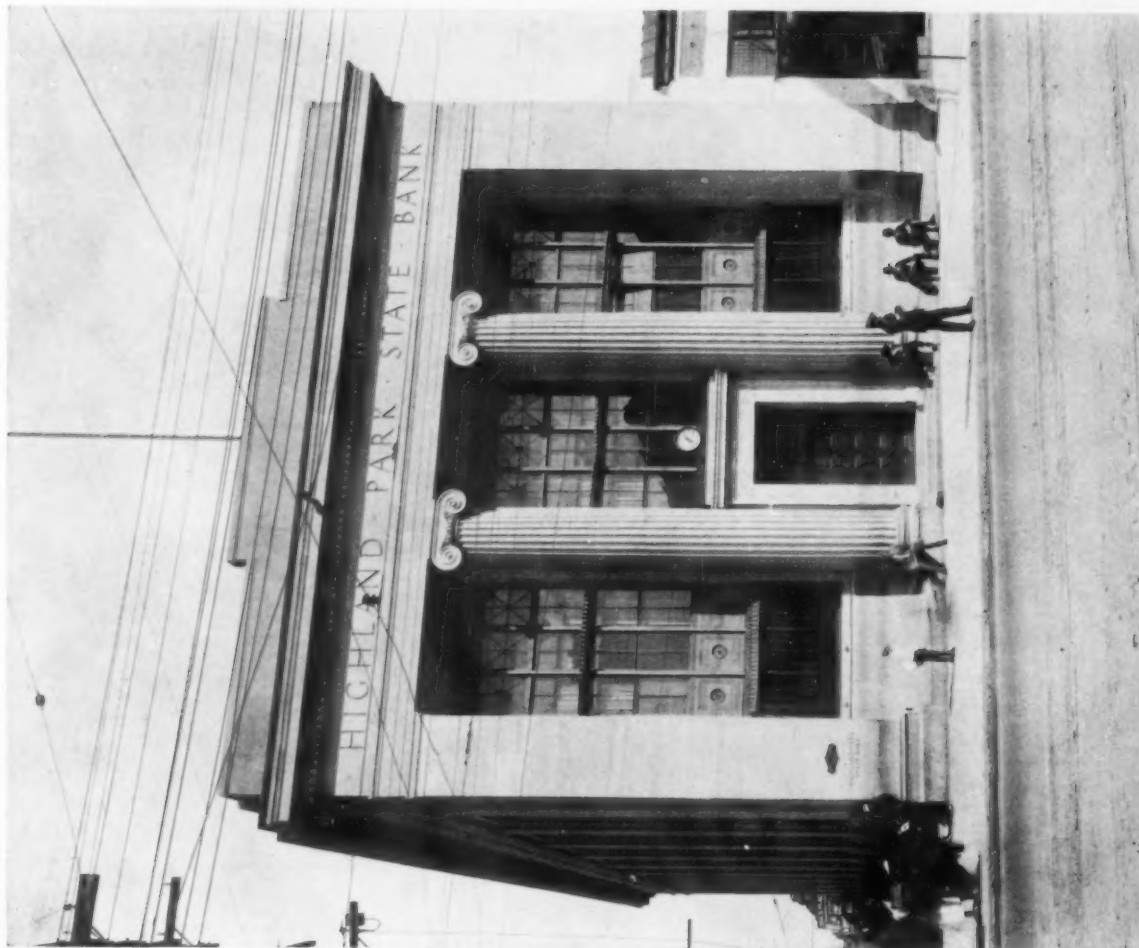
*THIS plan shows the simple typical arrangement of the Detroit branch banks. They usually have corner locations, enabling a well lighted banking room to be provided and also a good expanse of wall surface on the facade.*

DIME SAVINGS BANK, EAST JEFFERSON AVENUE AND BEAUFAIT STREET, DETROIT, MICH.  
SMITH, HINCHMAN & GRYLLS, ARCHITECTS





THE NATIONAL BANK OF COMMERCE, WEST FORT STREET, DETROIT, MICH.  
ALBERT KAHN, ARCHITECT



HIGHLAND PARK STATE BANK, DETROIT, MICH.  
ALBERT KAHN, ARCHITECT

# The Hartford Times Building

DONN BARBER, ARCHITECT

THE Madison Square Presbyterian Church, built in 1906 only to be torn down in 1919 to make way for an office building, was one of the last and probably the best buildings designed by the late Stanford White, of the firm of McKim, Mead & White. In addition to its interest as an architectural composition, this church was particularly noteworthy and epoch making in the fact that it was the first instance in this country where colored glazed terra cotta was used throughout in the architectural members.

When the Parkhurst Church, as it came to be called, was finished it created a great deal of favorable comment, particularly on account of its individuality and extraordinary richness and the unusual fact of its color. Its design has been very closely reproduced in southern California and in one of the large cities of one of the Southern States, and many of its details have been freely copied and reproduced over and over again. It was a building of unusual and strong personality, studied with infinite care as to color and kind of materials employed, skilfully handled and beautifully executed.

Many of our worthy structures in this country, some dating back to Revolutionary days, have been sacrificed in what has come to be called natural progress, and so this famous church—a veritable jewel in design—in its turn has had to make way for the steady march of commercialism.

It was a happy inspiration—when this building was being demolished, and there was the danger if not the probability that most if not all of the beautiful terra cotta detail would be destroyed—that led Donn Barber to grasp the opportunity of preserving the major portion of it, and arrange to incorporate it in the building for the *Hartford Times*, which is to be in no way a reproduction of the church, but a new combination of the old elements taken from the church.

When the *Hartford Times* acquired its very desirable new plot of ground on Prospect street opposite the end of New Atheneum street, a one-block street created be-

tween the Morgan Memorial and the Municipal Building, running from Main to Prospect street, it was with the idea of getting a plot sufficiently large to provide a low building for their occupancy in a neighborhood that was centrally located. It was realized that the position of the property required some suitable and commensurate architectural contribution to the neighborhood, situated as it is in the midst of many of Hartford's finest structures. The idea was to provide a simple, dignified, though modest, façade on Prospect street, and instructions were given to the architect to study and present something along these lines.

The building requirements called for a three-story building to show on the Prospect street front, or a wall height of about 40 feet by 180 feet long. A façade was studied along restrained Colonial lines of suitable face brick and sparingly used stone trim, when it was found that the cost of the façade, owing to the increased price of building materials available, was out of all proportion to the slight effect gained.

The Morgan Memorial is built of pink Tennessee marble, and the Municipal Building is built of white Bethel granite. The façade of the new *Times* Building is to be seen particularly from Main street at the end of and between these two flanking buildings. To secure an adequate architectural treatment with the limited means at the architect's disposal, was a problem. The solution of it is best described in Mr. Barber's own words:

"It so happened that the proposed *Times* Building, being a commercial building in every sense,



Perspective Showing Location at End of New Atheneum Street



and being a free standing building with light on all sides, admitted of the principal façade being treated more or less independently of the other façades and somewhat as an architectural screen. The plan arrangement and access to the building required merely a generous entrance into a public space on a first floor doing business with the public: access to stairways, corridors and to certain private offices. The lighting of these services was easy to take care of, so that a wide latitude was therefore left in the selection of size and character of openings. All the practical and working end of the building, it was found, could be placed back of this front line of service and amply lighted through the other three surrounding walls.

"At this stage of the problem I learned that the Parkhurst Church with its fine classic portico was being demolished, and I instinctively recalled the beautiful colonnades of Europe at the ends of streets and vistas: the Madeleine and Pantheon, the Chambre de Deputes in Paris, and any number of examples in Italy and elsewhere. To refresh my memory in detail I turned to a photograph of the church and immediately seemed to see a possibility of using the six granite columns and the two granite pilasters, arranged as the porch motif of five bays on the church, into a colonnade motif of seven bays, by

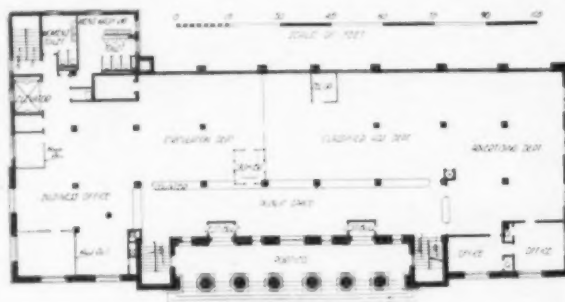
bringing the wall pilasters out to a line in the plane of the columns; also with the many running feet of cornice and other members encircling the church, the chance of creating a long, flat composition.

"The wonderfully beautiful and picturesque precedents of the buildings of Italy, where the principal façades are treated frankly as such and backed up by buildings of an entirely different character in design, occurred to me. I went down to the church and satisfied myself that instead of demolishing the building in the usual way, it was possible, with care, to take it down piece by piece, and number, pack and ship the pieces.

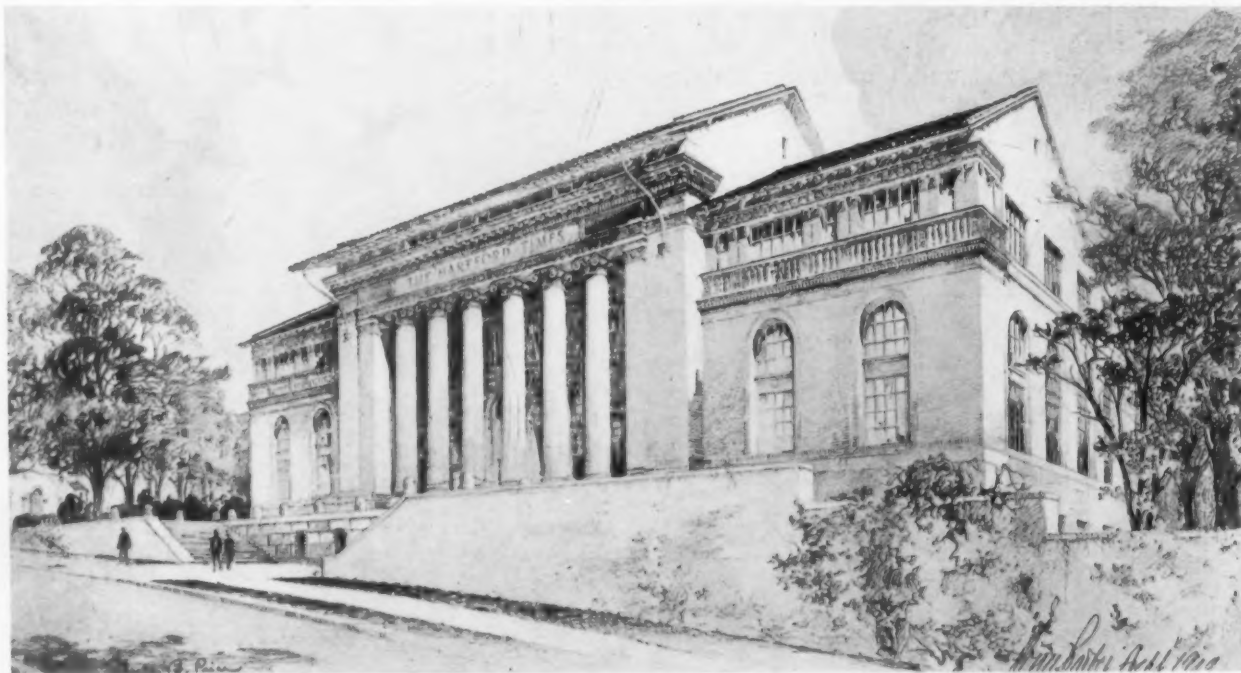
"In the design of the new *Hartford Times* façade, the original columns, pilasters and cornices are used; the steps, platforms and base courses all fitted together as they were originally, with the exception of the change in position of the pilasters. In the back wall of the arcade are used all the principal openings in the church façade. The large circular headed windows on the Twenty-fourth street façade have been used to form circular headed entrance doors,

and the other windows on the Twenty-fourth street façade, and the windows under the columns on the Madison avenue façade, and the two side doors, are also all used in a new arrangement in this wall.

"As the church was being taken down each

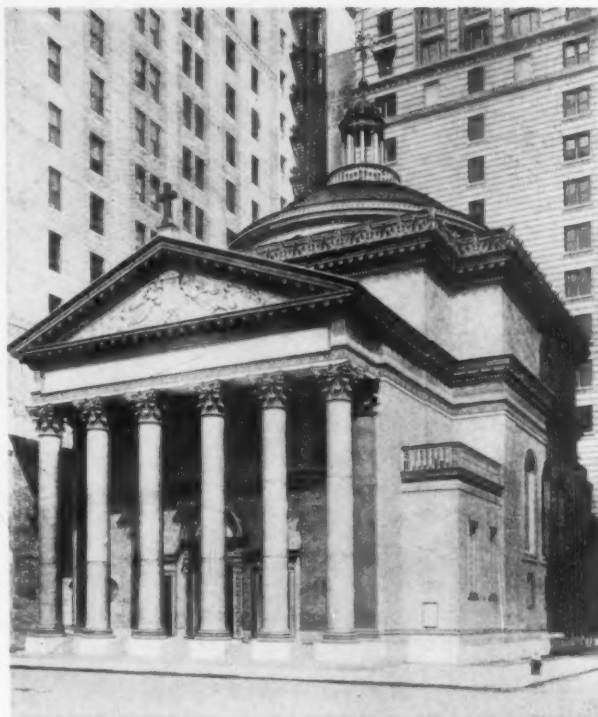


Main Floor Plan

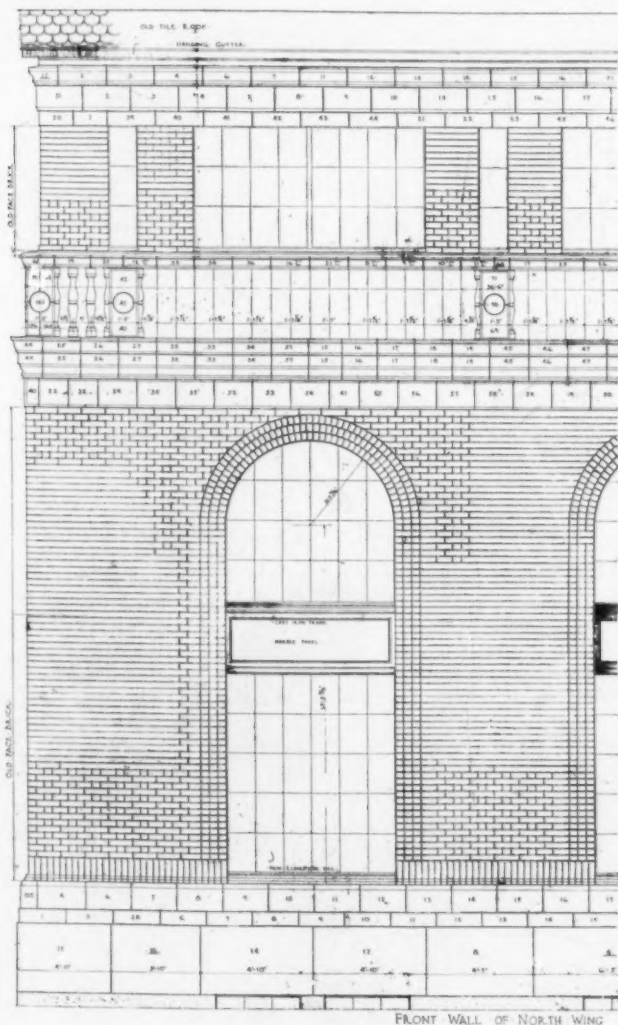


Perspective Sketch of Hartford Times Building Showing Solution of Grade Problem

piece of terra cotta was numbered according to an arranged scheme, and although many of the pieces in the new building find themselves side by side as of old, transpositions have been made necessary in many places. For instance, there existed a certain number of definitely designed breaks and right angle turns in the cornice so that I was limited in the composition to these breaks that existed. It was also necessary to recombine the materials without any cutting, since that would have destroyed the spacing of the running ornament. It all happened very quickly, and after the church had been taken down and the materials carefully packed and shipped, we were left with our numbered diagrams and numbered pieces to work with, inflexible in their sizes and their sequence, and certain photographs that had been especially taken. It amounted to a cut-up puzzle of a certain picture with the possibility of creating a new picture of the same pieces. In the new composition the original Corinthian order is changed to Ionic. By the use of an Ionic cap in the order and an added



Madison Square Presbyterian Church from Which Material for Hartford Times Building Was Taken

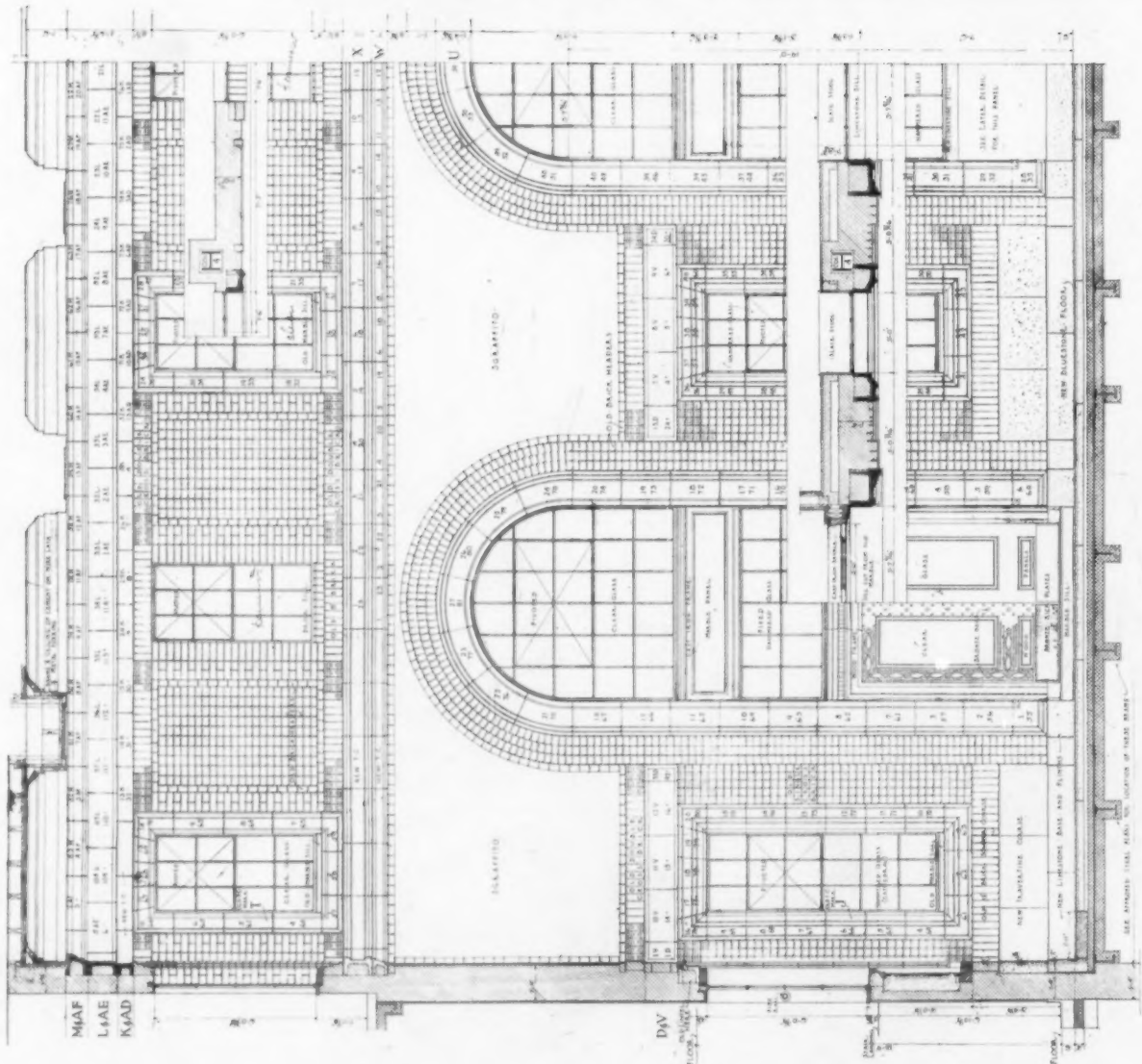
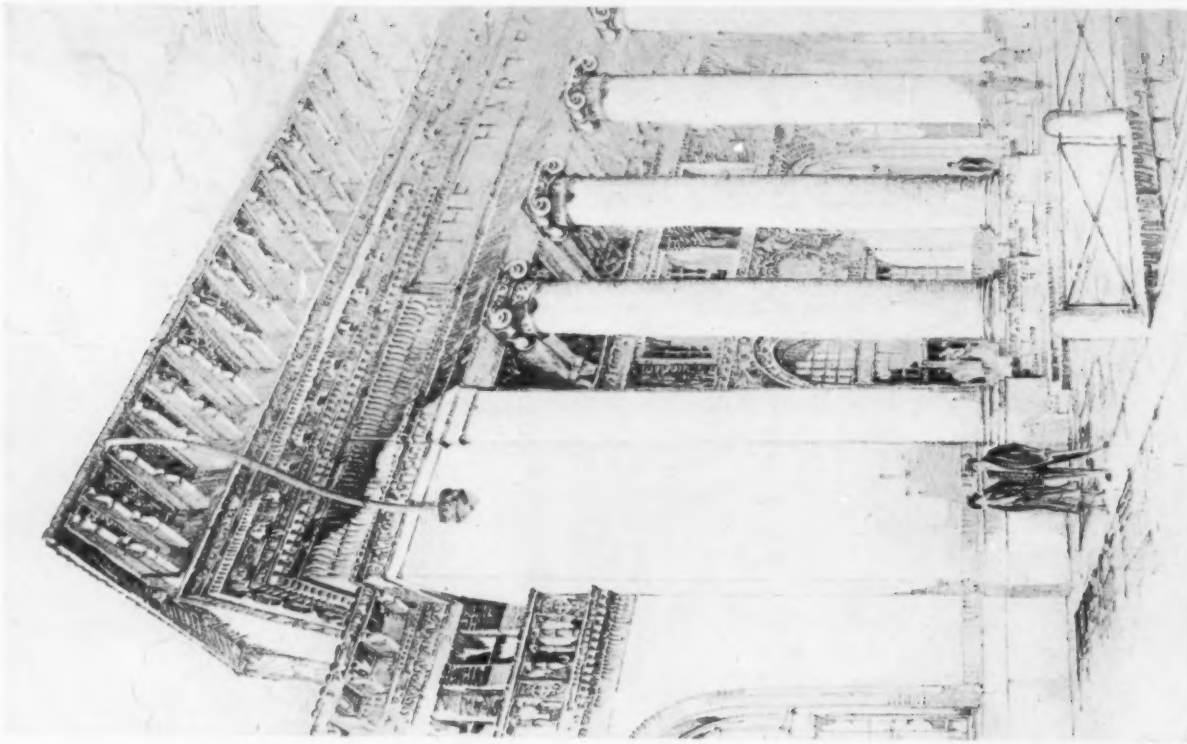


Detail at End of Wing

plinth between the column base and pedestal, we were enabled to adjust the height of the order to our established, required story heights.

"It has been an inspiration and a most interesting experience to have been able to preserve and use these gorgeous materials, most of which could in all probability not be duplicated at the present time under the conditions obtaining in the material market. The façade having been arranged for, the other problem was that of placing it in a proper relation of height to the Morgan Memorial and Municipal Building. There is a slight crown to Atheneum street from Main to Prospect street; the Prospect street end of Atheneum is somewhat lower than the Main street end. There is quite a sudden down hill grade to Prospect street from left to right looking from Main. I have therefore taken the water-table line of the Morgan Memorial and the corresponding water-table line of the Municipal Building, which are practically at the same level, and carried these lines across the Prospect street front of the *Times* Building, creating a platform or approach on which the arcade motif of the building is placed. Curiously enough it was possible to carry the balustrade motif around on the level of the balustrade motif of the other two buildings. Tile roofs have been added to increase the height of the building. These with the trees on Prospect street and around the *Times* Building should add tremendously to the color and framing of the picture."





DETAILS OF ENTRANCE TO HARTFORD TIMES BUILDING SHOWING ADAPTATION OF MATERIAL FROM MADISON SQUARE CHURCH  
DONN BARBER, ARCHITECT





## Villa Carola

THE RESIDENCE OF MR. AND MRS. ISAAC GUGGENHEIM, PORT WASHINGTON, L. I.

H. VAN BUREN MAGONIGLE, ARCHITECT

THE property on which the Villa Carola is located is a rather narrow and long strip of beautifully modeled land, a large proportion of which is occupied by a private golf course, by thickly wooded areas, and by a group of large service and farm buildings. The new residence and its gardens occupy a relatively small portion, fortunately situated on the highest point of the property which gradually slopes northeast and northwest toward the Sound and Hempstead Harbor. Leading toward this knoll there existed under former ownership a straight road about 1,400 feet in length, bordered on each side in the upper portion by fine locust trees and in the lower portion by maples. When Mr. Guggenheim bought the property this road was abandoned and the road-bed itself grassed over, forming a beautiful, shady, grassy *allée*.

By a most fortunate circumstance the axis of the grassy avenue runs almost due northeast and southwest, and the main living rooms of the house were therefore placed so as to command the southwesterly exposure—an ideal exposure for any house in this climate. On the northwesterly side of the house a forecourt was designed as the termination of the carriage approach, bounded by the façade of the house with a porte cochère on one side, and by the parapet of the house terrace and by box hedges on the others.

On the southwesterly or living front of the house a broad terrace, shaded at each end by two large elms, forms a well proportioned base. The gardens extend from this terrace to the locust avenue and are divided practically into four parts. The central portion is a broad green sward of the width of the avenue, so that this quiet *tapis vert* is carried up to the foot of the terrace. It is proposed that at the extreme southwesterly end of the avenue a *Tempietto* will be built to emphasize this long axis and terminate the vista beautifully.

On either side of this central green carpet are flower gardens, the axes of which correspond to the axes of the enclosed porches at each end of the southwesterly façade. These gardens have perennial borders, against box hedges on the inside and hemlock hedges on the outside. The hemlock hedges are to be allowed to grow to a considerable height and be trimmed to formal lines so as to form a green wall around the gardens to give them privacy and intimate charm.

At the foot of the gardens is the fourth portion, which is in reality a lower terrace designed principally to introduce water and rose gardens into the composition. In the center, lying across the axis of the locust avenue and the *tapis vert* is a rectangular pool. At the ends of the pool are two rose gardens. Two wall fountains are erected on



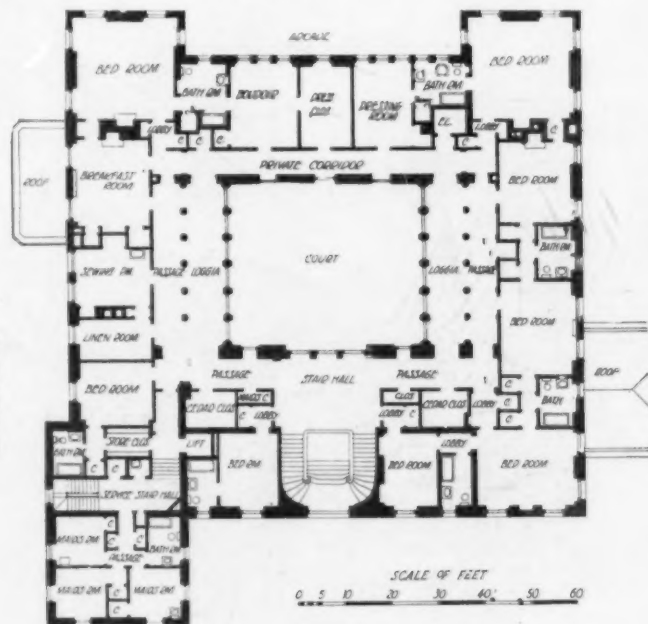
Entrance Front from Approach to Forecourt

the southwesterly side of them on the axes of the main flower gardens. The fountain groups in the niches of the wall fountains were modeled by Mr. F. Landi, who also made, before his death, the sketches for the figures for the pool which were developed in the groups finally modeled by Mr.

Chester Beach. From this lower terrace one descends by broad, low steps to the avenue, through lofty antique stone pylons, which accent the junction of the avenue and the garden. The wall fountains and the setting for the pylons were designed by Mr. Magonigle. Vitale, Brinckerhoff



First Floor Plan



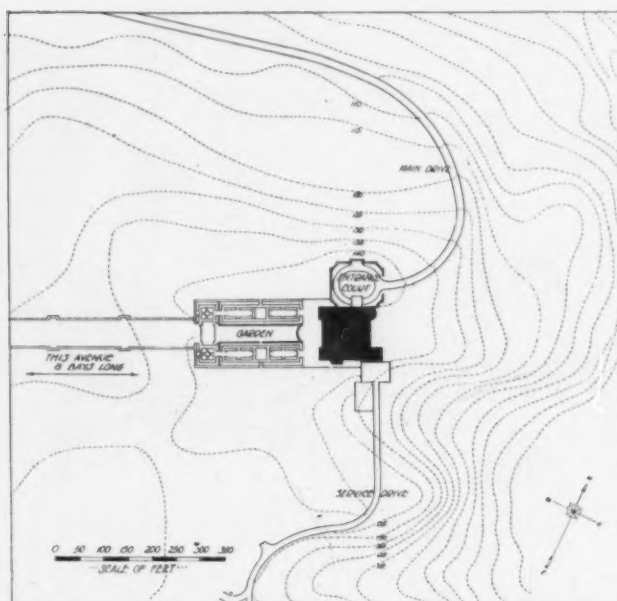
Second Floor Plan

SCALE OF FEET  
0 5 10 20 30 40 50 60

& Geiffert were the landscape architects.

In considering the house it is important to understand the factors which suggested and controlled the plan and design. These are to be found in the site, the view, the aspects and prevailing breezes in summertime. Beautiful water views are obtainable from the northeasterly and southwesterly fronts. The prevailing breezes are from the southwest. In order to secure at the same time a free circulation of air through all of the rooms in both stories, and a plan which would be sufficiently compact and give good circulation and easy and rapid service, it was determined to build the house around a *cortile* open to the sky.

The exterior of the house is of brick, accented with terra cotta and marble. The brickwork can



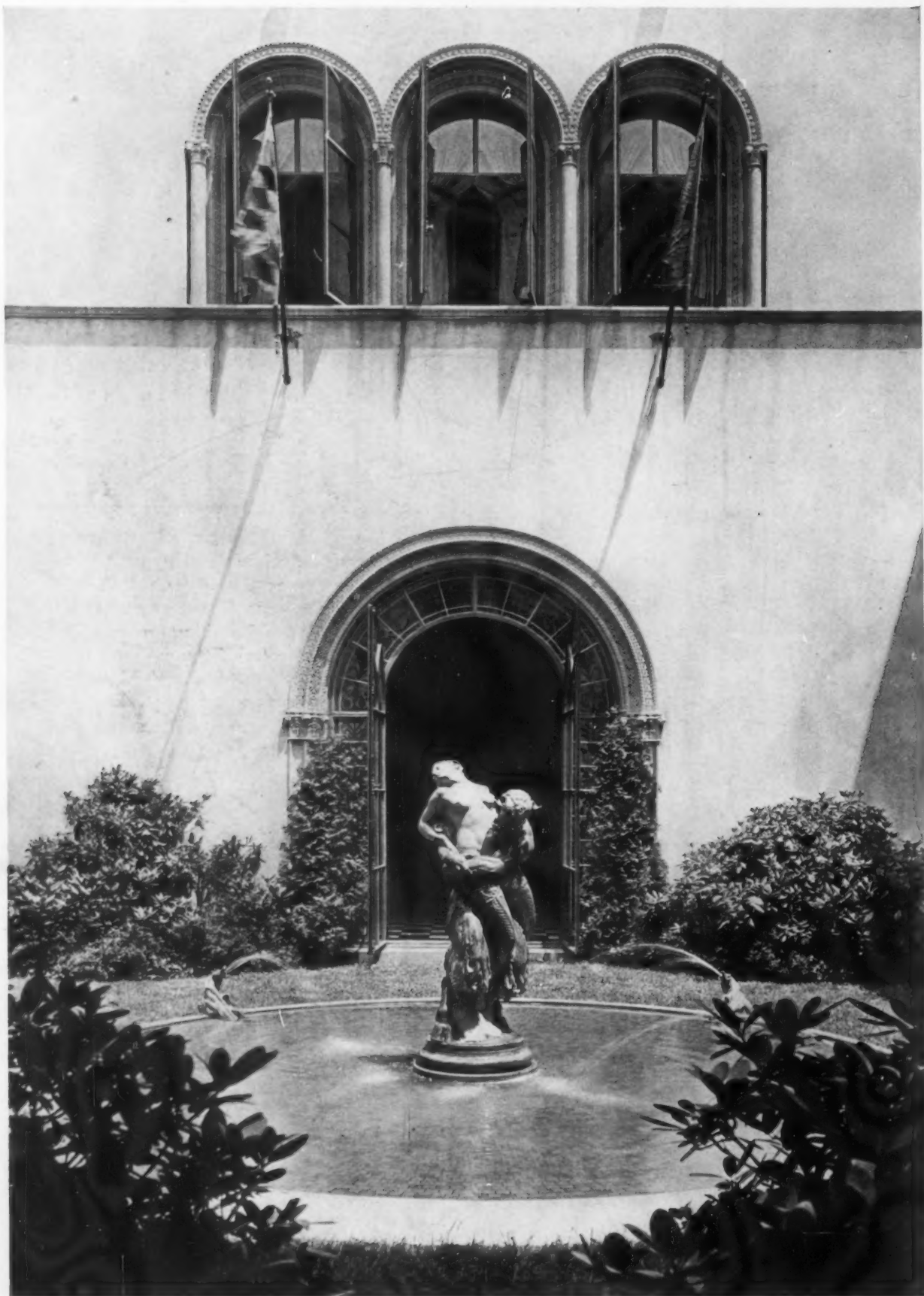
Plot Plan in Vicinity of House

probably never be duplicated. The brick used was the accumulation of several years in a large plant, of brick that had not burned true to shade and was therefore not considered usable. They varied in tone from rich brownish purple to a light yellow, through all the intermediate shades of brown and red. It was possible to distinguish thirteen general color groups, each of these groups varying in shade in themselves, and each brick in the sub-groups frequently varying in color from one end to the other. This gave an extraordinary range of beautiful colors; and by carefully calculating the exact proportion of each of the thirteen general colors which would produce the big, general tone desired for the wall, taking into consideration also the width and color of the mortar joints to be



View of Tower on Easterly Corner





FAIENCE FOUNTAIN AND LONG GALLERY DOOR IN THE INTERIOR COURT  
H. VAN BUREN MAGONIGLE, ARCHITECT; ROBERT AITKEN, SCULPTOR

used, it was possible to predetermine the general color tone of the wall, which is at a distance a warm reddish brown, but on a closer view is seen to be composed of numerous units of beautiful shades. The brick is what is known as wire-cut with a scratched surface and then rerolled. This gives a rough surface texture of unusual beauty and quality. The brick is laid in Flemish bond, the stretchers being used as headers, and two stretchers with a dry joint between forming one long stretcher. The joint is of grit cement mortar toned to a deep cream.

The color and finish of the terra cotta were determined upon, after numerous experiments, to harmonize with the general color tone of the brickwork. The backgrounds of the ornamental portions are treated with polychrome glazes in a novel and interesting manner.

The marble columns in the loggias, porte cochère and the exterior arcade in the second story of the southwesterly front were all selected of white marble of various tones and veinings, and then stained with a ferric stain, producing a golden tone that harmonizes them with the general tone of the house.

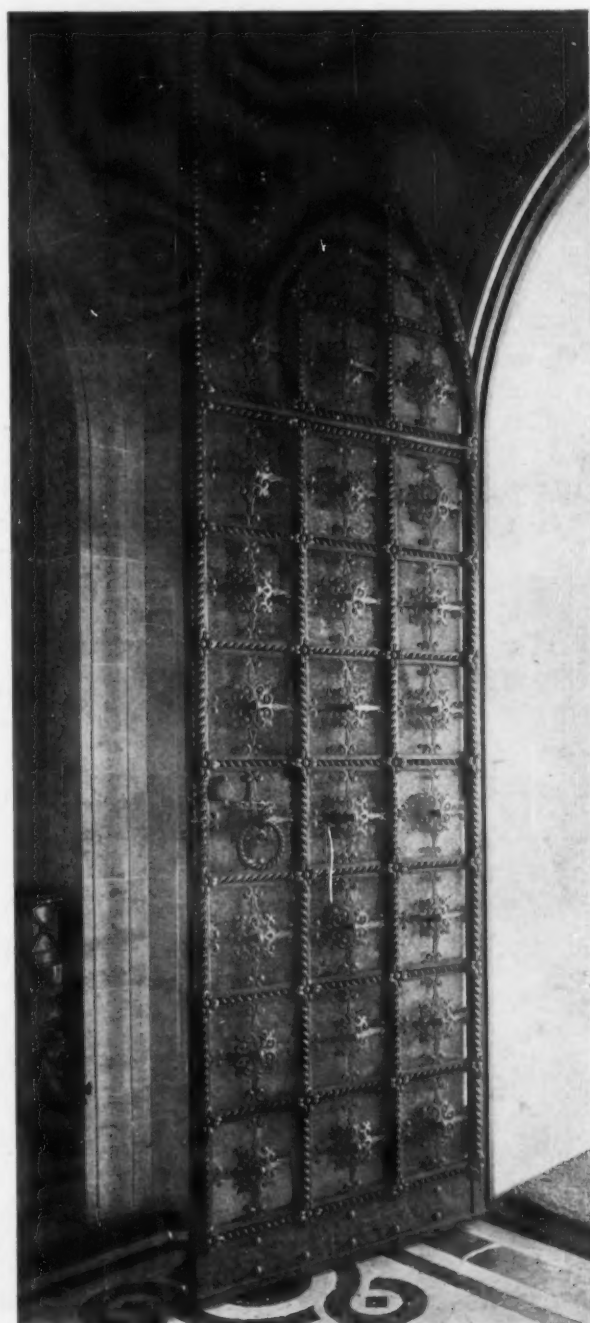
The overhanging eaves of the roof, which is fire-proof, are cased with cypress beams. The roof itself is covered with pan-and-roll tiles specially designed and manufactured for this house. The colors of the tiles are varied and reproduce in a generally warmer tone the color of the brickwork. Some green glazes are introduced here and there to give the effect of a mossy old roof.

The walls of the entrance vestibule are of travertine and the floor of marble inlay. The decorative painting of the ceiling, which is so designed as to carry up through it the character and color of the faience corners, is by Herman T. Schladermundt. The cornice and ceiling ribs are of cypress with aluminum powder rubbed into the grain of the wood and decorated in gray and yellow. The panels between the ribs are of plaster; the central panel of the ceiling is of decorated glass painted with the signs of the zodiac, through which the vestibule is lighted.

The Long Gallery, carried out in early Italian style, has a marble floor. The walls are of travertine with a fine, sand rubbed finish. The two doors at each side of the main staircase are of Italian walnut, carved. The remaining doors were decorated by Herman T. Schladermundt, who also decorated the ceiling which is Siennese in character in black, white and red. Between the brackets supporting the cross ribs are panels in red, black, blue and white in heraldic devices. This painting is done upon cypress treated with muriatic acid and then burned with a plumber's torch, and the

soft grain brushed out, leaving the harder parts of the wood to form a dark tracery on the light ground.

The loggias at each side of the court connect the living rooms, which are on the southerly and westerly sides of the house, with the Long Gallery. They open into the court with three large arches which are glazed and have borders of painted glass. At the ends of each of these loggias are panels in which doors occur, and around these door openings are mural decorations painted by Edith Magonigle.



Detail of the Main Entrance Doors  
One of Two in Wrought Iron and Glass

The walls of the court are of stucco; the string course at the second story level and the coping at the top are of white Vermont marble. The marble columns in the loggias in the second story are of Vermont marble, and toned with a preparation which makes them harmonious with the warm cream of the stucco walls.

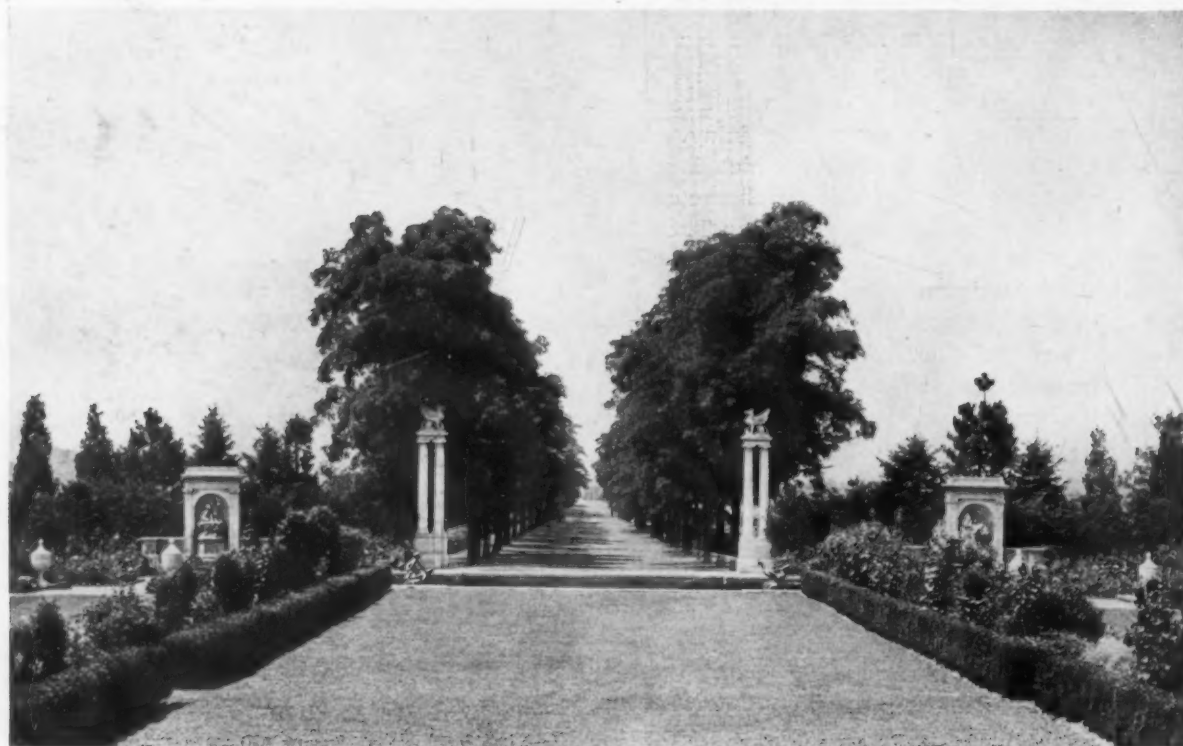
The fountain basin in the center of the court is lined with blue, green and blue gray tiles. The outer rim of the basin is of North River blue-stone. The fountain group, representing a satyr carrying away a mermaid, is by Robert Aitken and is executed in colored faience. The four grotesque bronze animals spouting water are also by Mr. Aitken. Under the balcony is a searchlight which throws a beam of light on the fountain at night, and in each corner of the court is an electric outlet for lights in the court on festal occasions.

The service portions of the house were given a large amount of study in order to provide labor-saving arrangements and make housekeeping easy. For example, the doors throughout are laminated, and with no panels or mouldings to catch dust. The door trims are perfectly plain without mouldings and with rounded edges. The windows have no trim at all, but the plaster turns into the jambs and heads with rounded angles. The hardware is of solid white metal with white porcelain knobs. The hallways and passages are tiled to a height of

5 feet and have a sanitary base. Along the top of the tile wainscoting is a 2-inch band of black paint so that when the rounded ledge of the wainscot is dusted, there will be no dirt mark on the wall. All of the interior and exterior corners of floors, walls and ceilings are rounded. The floors are of plastic linoleum, which is carried up the service stairway. Around all of the service rooms, including the servants' bedrooms and closets, are white tile bases with white tile plinths under the wood trims, and the saddles are of white marble.

The kitchen walls are tiled to a height of 8 feet and above that are enameled plaster. The sinks are of white metal.

The refrigerating machinery room, which has an ice-cream freezer electrically operated, as well as a machine for making ice for the table, has the walls insulated with sound-proofing material. This is true also of the room in which the elevator machinery and the vacuum-cleaning machinery is enclosed. The vacuum cleaner is connected through piping with all parts of the house, and dust is washed away into the drainage system outside of the house. The heating plant consists of a range of three boilers so that one or more may be operated according to the state of the thermometer. The heating in the main portion of the house is by indirect steam, and the temperature is controlled by thermostats located in every room.



Vista from the Garden Terrace  
Vitale, Brinckerhoff & Geiffert, Landscape Architects





VIEW OF GARDEN FRONT ACROSS THE POOL

HOUSE OF MR. AND MRS. ISAAC GUGGENHEIM, PORT WASHINGTON, LONG ISLAND, N. Y.

H. VAN BUREN MAGONIGLE, ARCHITECT

VITALE, BRINCKERHOFF & GEIFFERT, LANDSCAPE ARCHITECTS

1000  
1000  
1000  
1000



DETAIL ON GARDEN TERRACE

HOUSE OF MR. AND MRS. ISAAC GUGGENHEIM, PORT WASHINGTON, LONG ISLAND, N. Y.

H. VAN BUREN MAGONIGLE, ARCHITECT

VITALE, BRINCKERHOFF & GEIFFERT, LANDSCAPE ARCHITECTS



1000000  
1000000  
1000000  
1000000



DETAIL ON GARDEN TERRACE

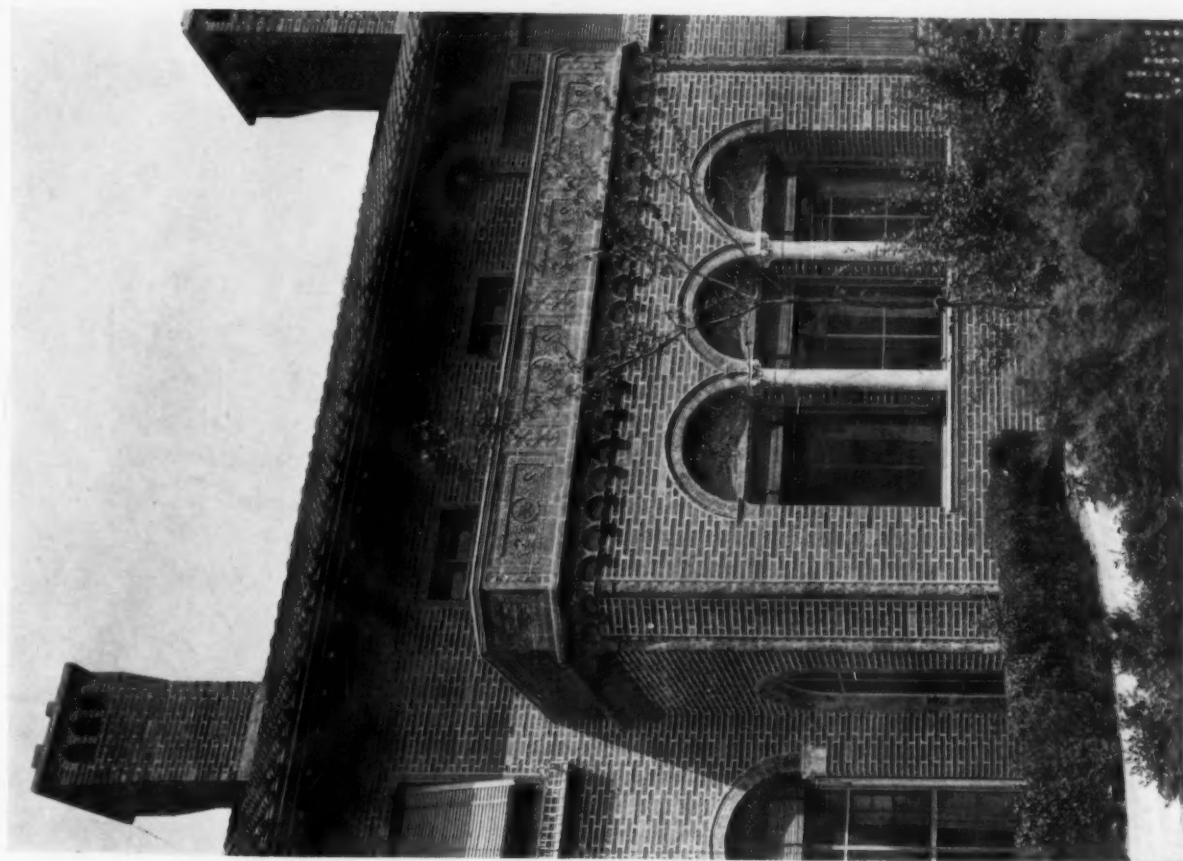
HOUSE OF MR. AND MRS. ISAAC GUGGENHEIM, PORT WASHINGTON, LONG ISLAND, N. Y.

H. VAN BUREN MAGONIGLE, ARCHITECT

VITALE, BRINCKERHOFF & GEIFFERT, LANDSCAPE ARCHITECTS



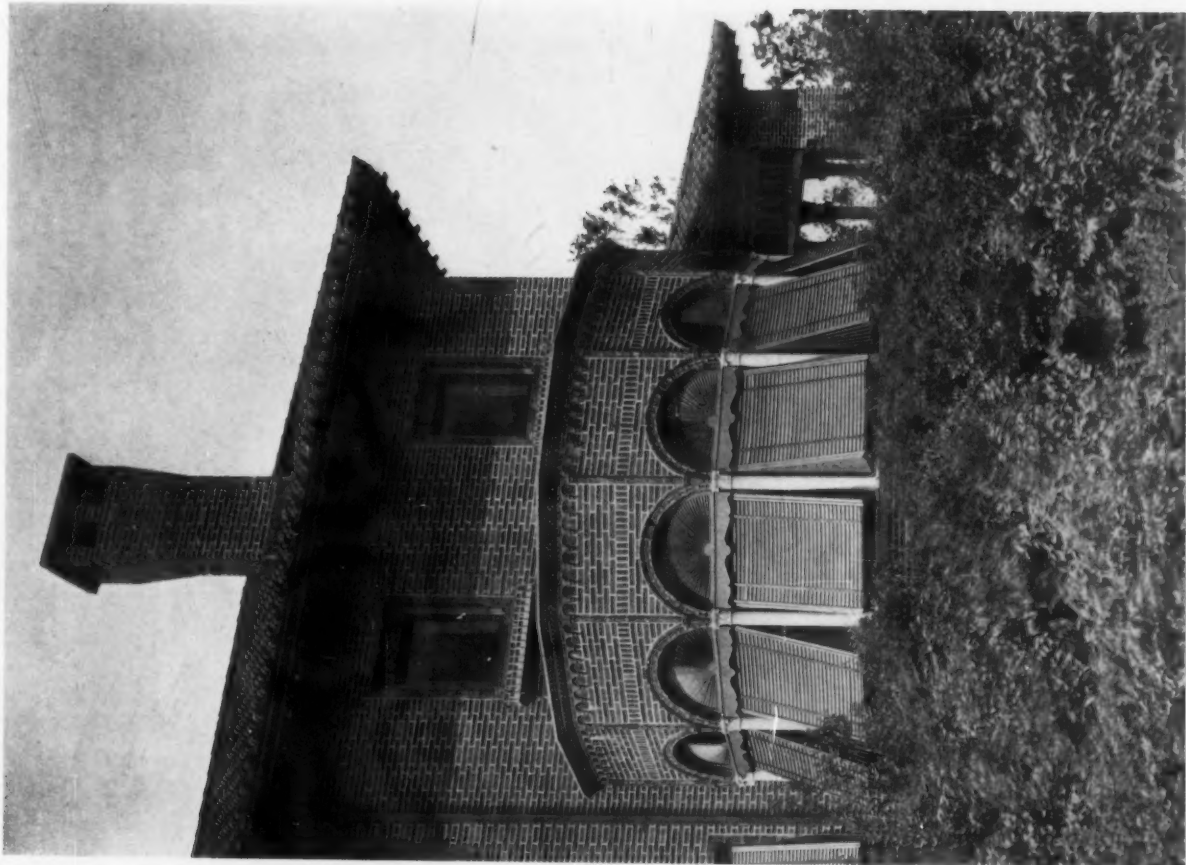




DETAIL OF DINING ROOM BAY

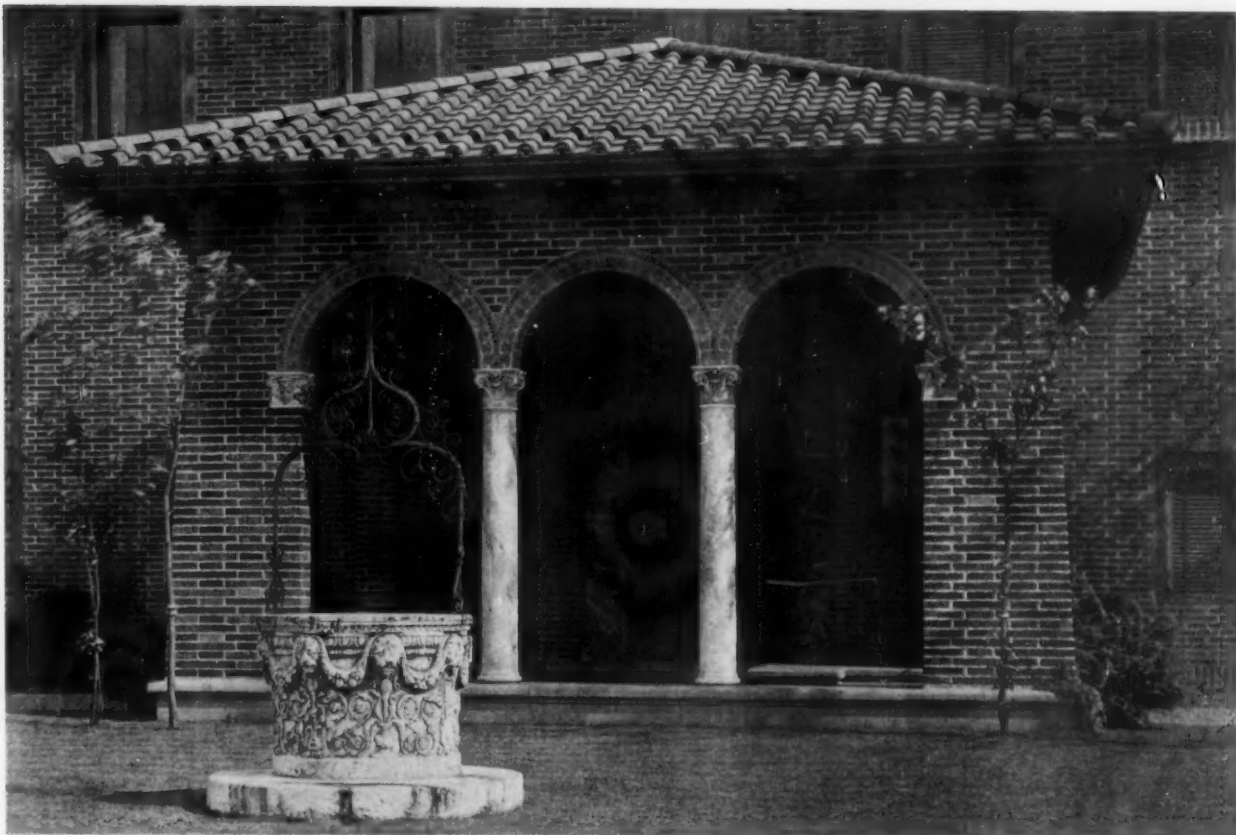
HOUSE OF MR. AND MRS. ISAAC GUGGENHEIM, PORT WASHINGTON, LONG ISLAND, N. Y.

H. VAN BUREN MAGONIGLE, ARCHITECT



DETAIL OF BAY ROOM EXTERIOR

1880  
1881  
1882  
1883  
1884



EXTERIOR DETAIL OF PORTE COCHERE



DETAIL OF ENTRANCE FROM PORTE COCHERE

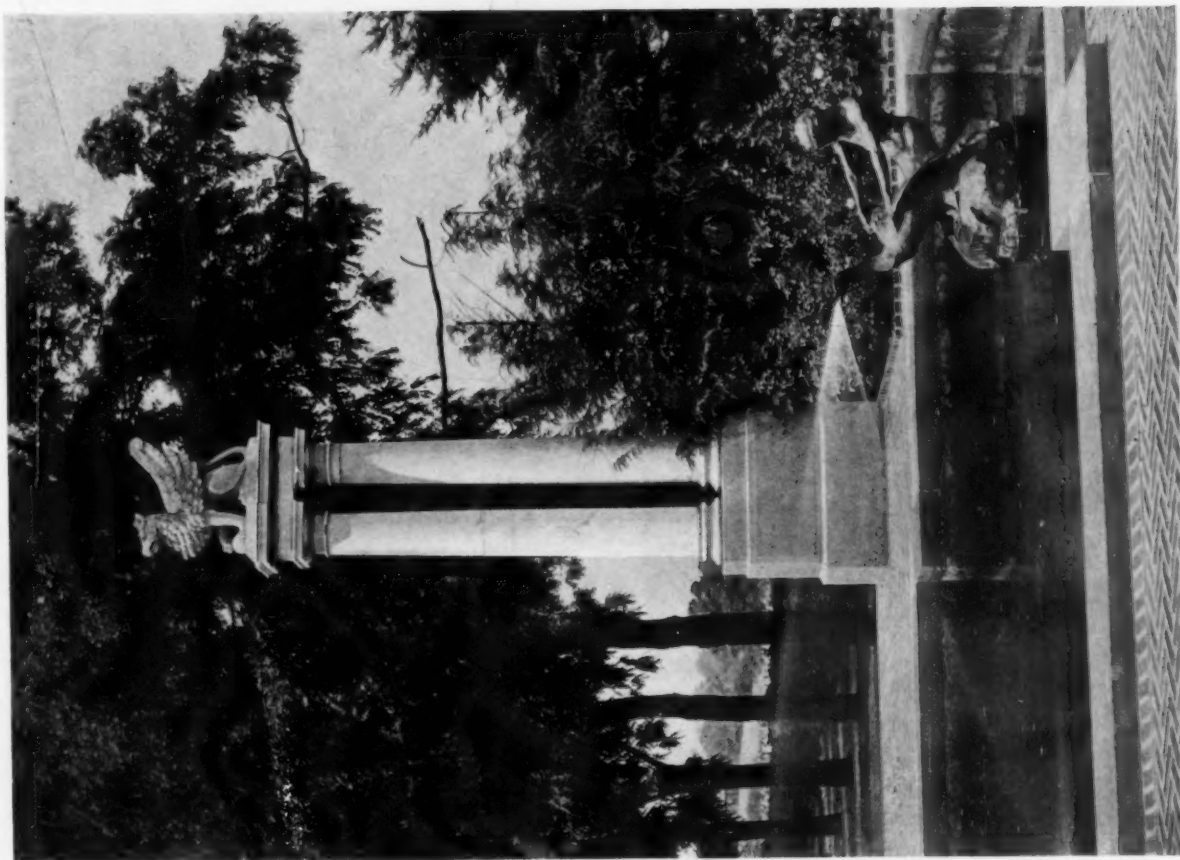
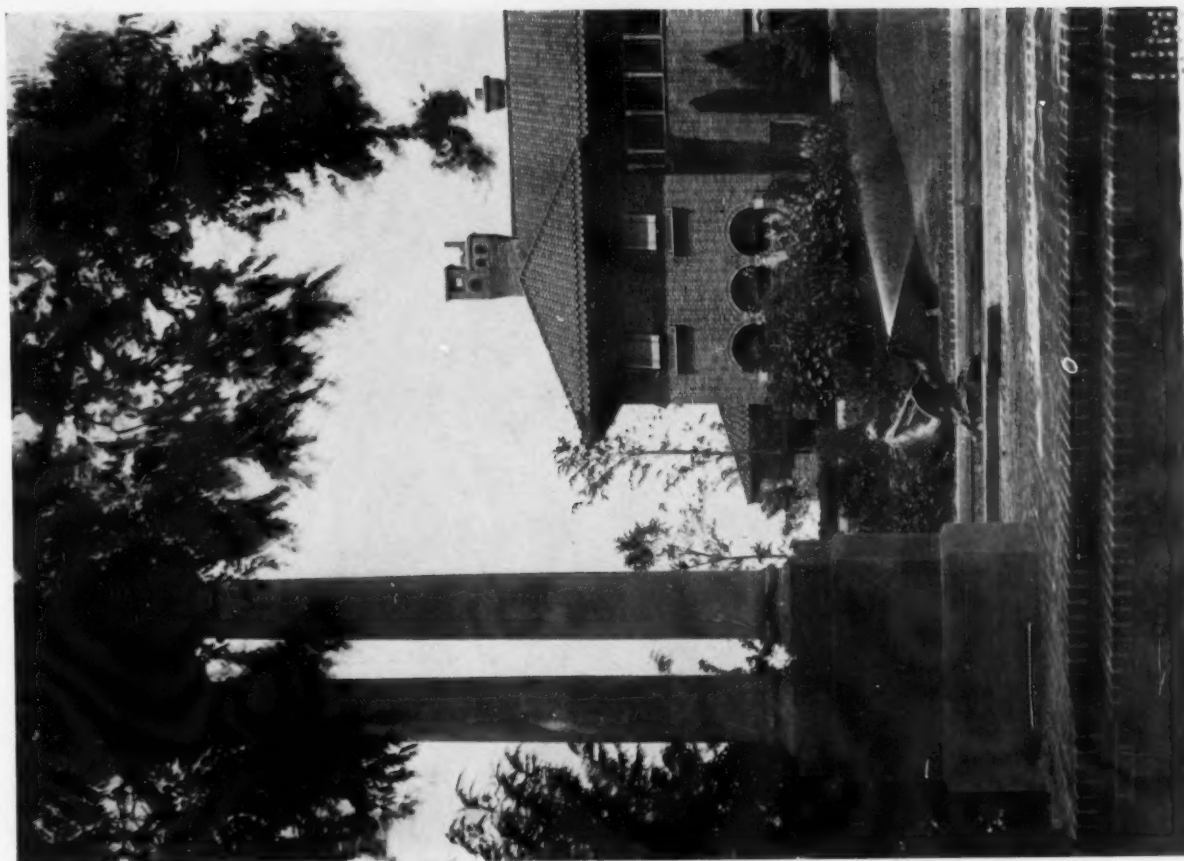
HOUSE OF MR. AND MRS. ISAAC GUGGENHEIM, PORT WASHINGTON, LONG ISLAND, N. Y.

H. VAN BUREN MAGONIGLE, ARCHITECT



100

100



DETAILS OF POOL AT END OF AVENUE OF TREES

HOUSE OF MR. AND MRS. ISAAC GUGGENHEIM, PORT WASHINGTON, LONG ISLAND, N. Y.

H. VAN BUREN MAGONIGLE, ARCHITECT

VITALE, BRINCKERHOFF & GEIFFERT, LANDSCAPE ARCHITECTS

1000  
1000  
1000  
1000

1000  
1000  
1000  
1000

1000  
1000  
1000  
1000

1000  
1000  
1000  
1000

1000  
1000  
1000  
1000



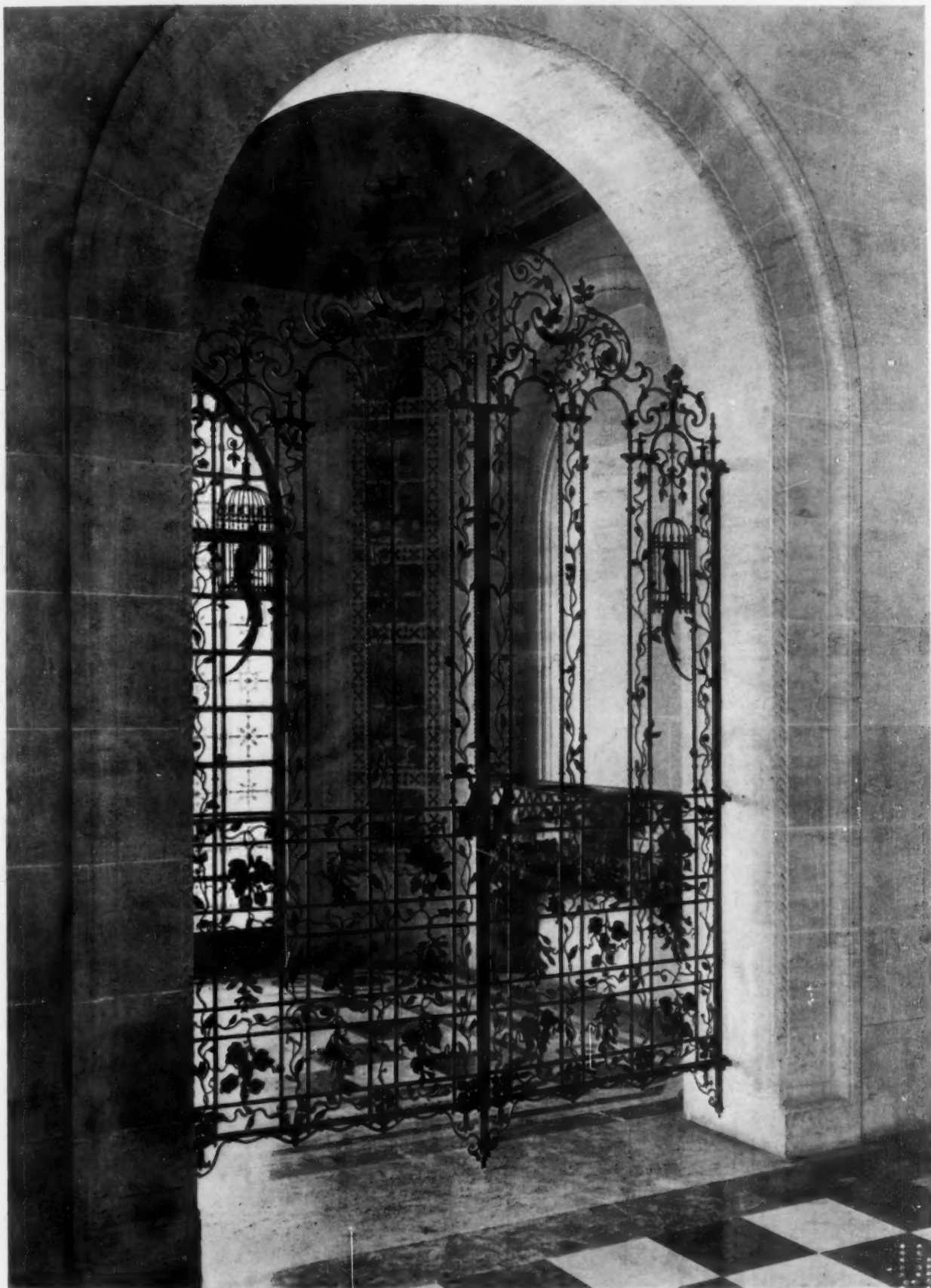


VIEW OF INTERIOR COURT

HOUSE OF MR. AND MRS. ISAAC GUGGENHEIM, PORT WASHINGTON, LONG ISLAND, N. Y.

H. VAN BUREN MAGONIGLE, ARCHITECT  
ROBERT AITKEN, SCULPTOR

100



WROUGHT IRON GATE AT ENTRANCE LOBBY

HOUSE OF MR. AND MRS. ISAAC GUGGENHEIM, PORT WASHINGTON, LONG ISLAND, N. Y.

H. VAN BUREN MAGONIGLE, ARCHITECT



200



FOUNTAIN AND AQUARIUM IN SUMMER DINING ROOM

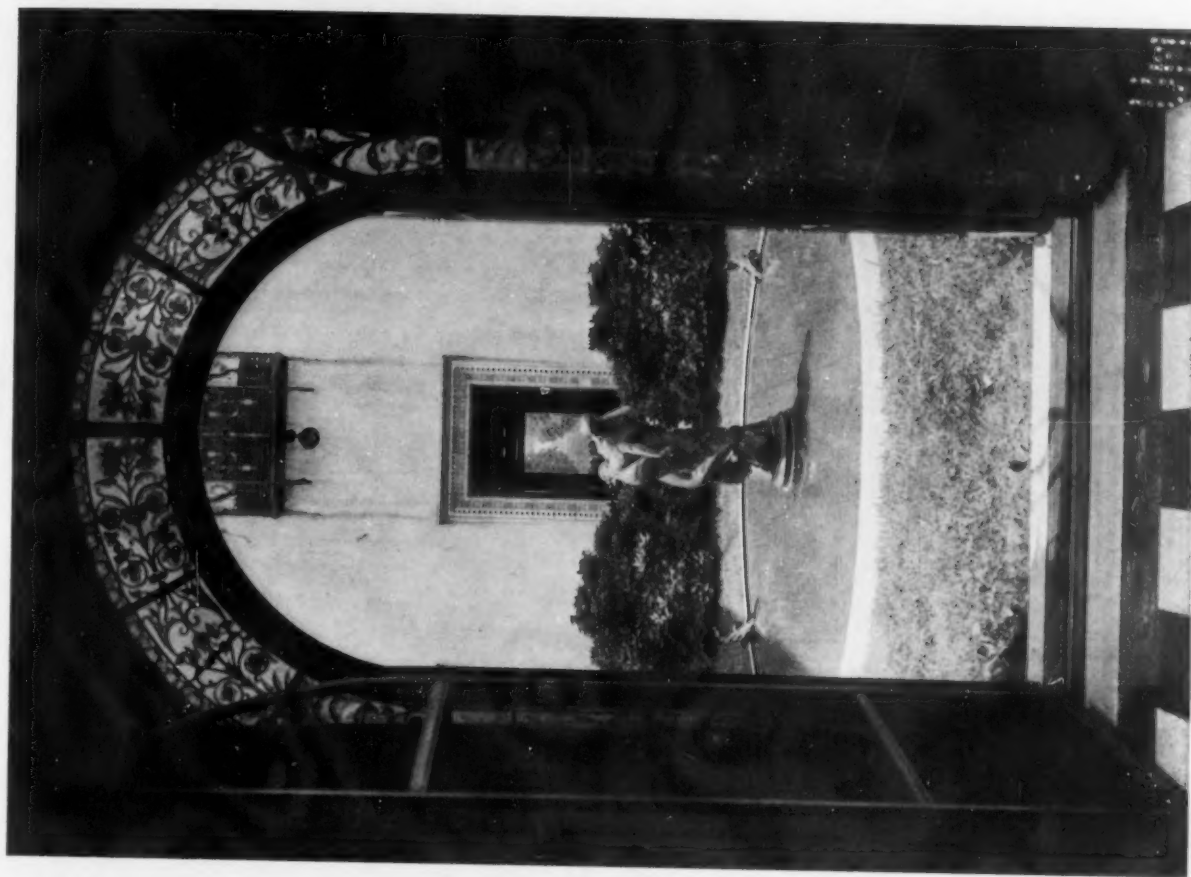
HOUSE OF MR. AND MRS. ISAAC GUGGENHEIM. PORT WASHINGTON, LONG ISLAND, N. Y.

H. VAN BUREN MAGONIGLE, ARCHITECT

1880  
1881  
1882

1883  
1884  
1885





GALLERY DOOR TO COURT

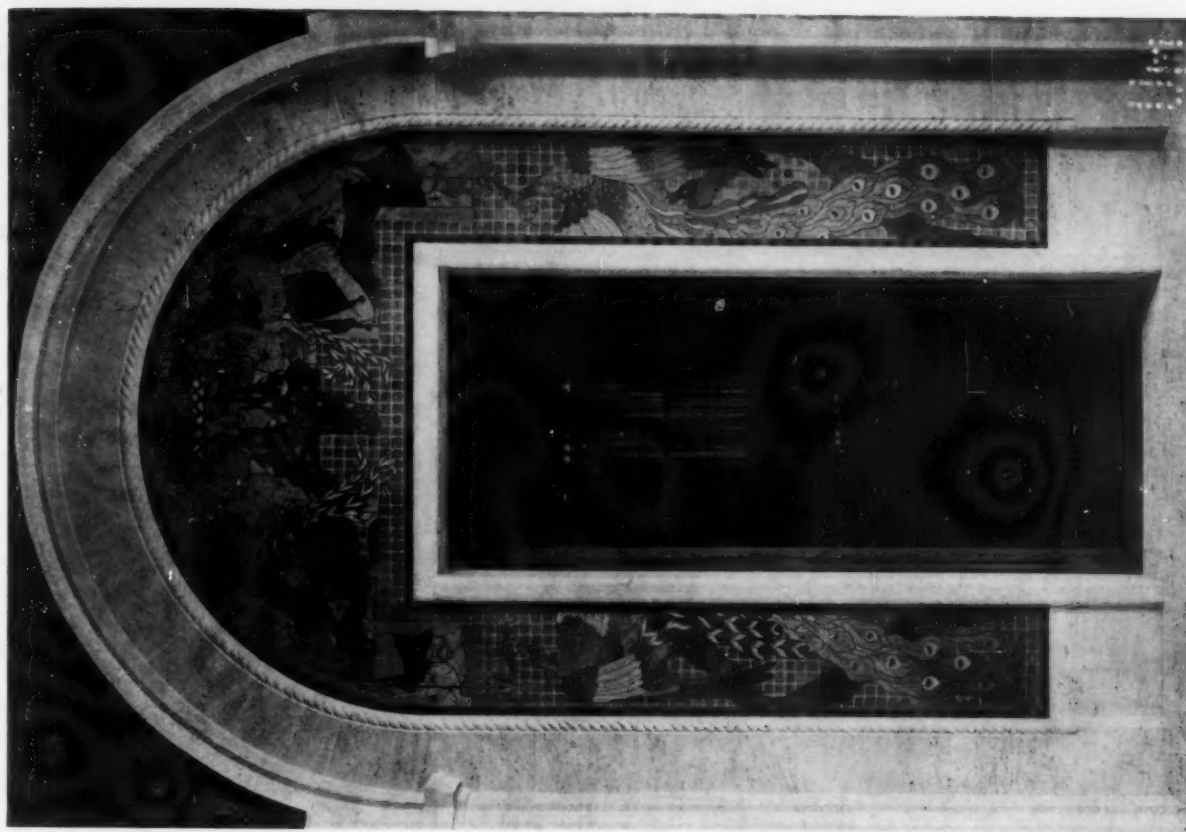


STAIRWAY WINDOW

HOUSE OF MR. AND MRS. ISAAC GUGGENHEIM, PORT WASHINGTON, LONG ISLAND, N. Y.

H. VAN BUREN MAGONIGLE, ARCHITECT

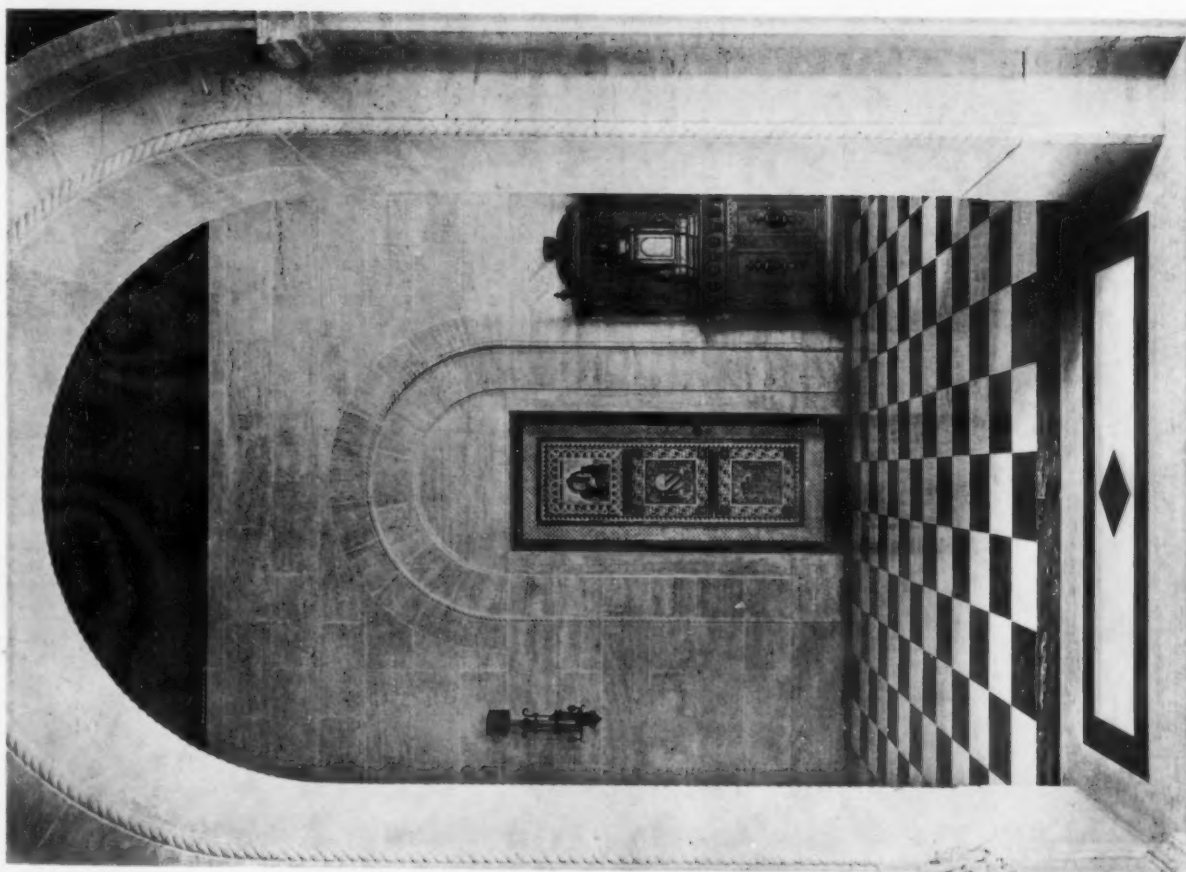
100  
100  
100  
100  
100



DOORWAY TO ORGAN LOBBY FROM LOGGIA  
Decorative Painting by Edith Magonigle

HOUSE OF MR. AND MRS. ISAAC GUGGENHEIM, PORT WASHINGTON, LONG ISLAND, N. Y.

H. VAN BUREN MAGONIGLE, ARCHITECT



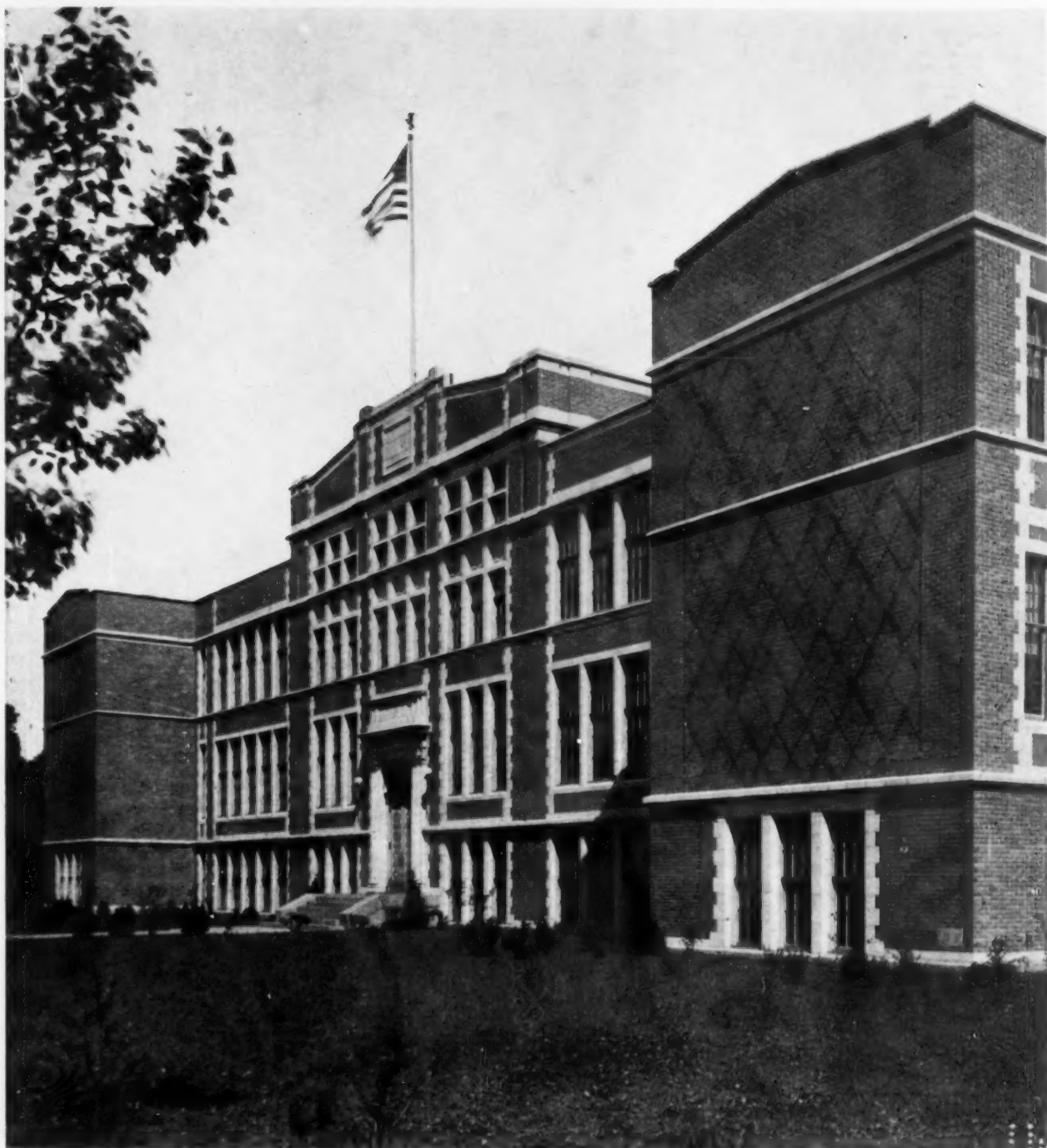
VIEW ACROSS GALLERY SHOWING LIBRARY DOOR  
Decorated by Herman T. Schladermunde

HOUSE OF MR. AND MRS. ISAAC GUGGENHEIM, PORT WASHINGTON, LONG ISLAND, N. Y.

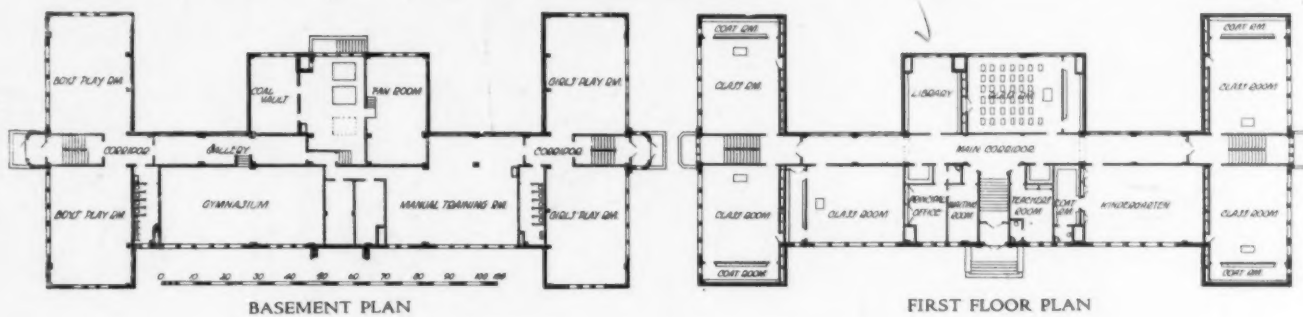
H. VAN BUREN MAGONIGLE, ARCHITECT



100  
100  
100  
100  
100



VIEW OF MAIN FRONT



EVERGREEN AVENUE GRAMMAR SCHOOL, PLAINFIELD, N. J.

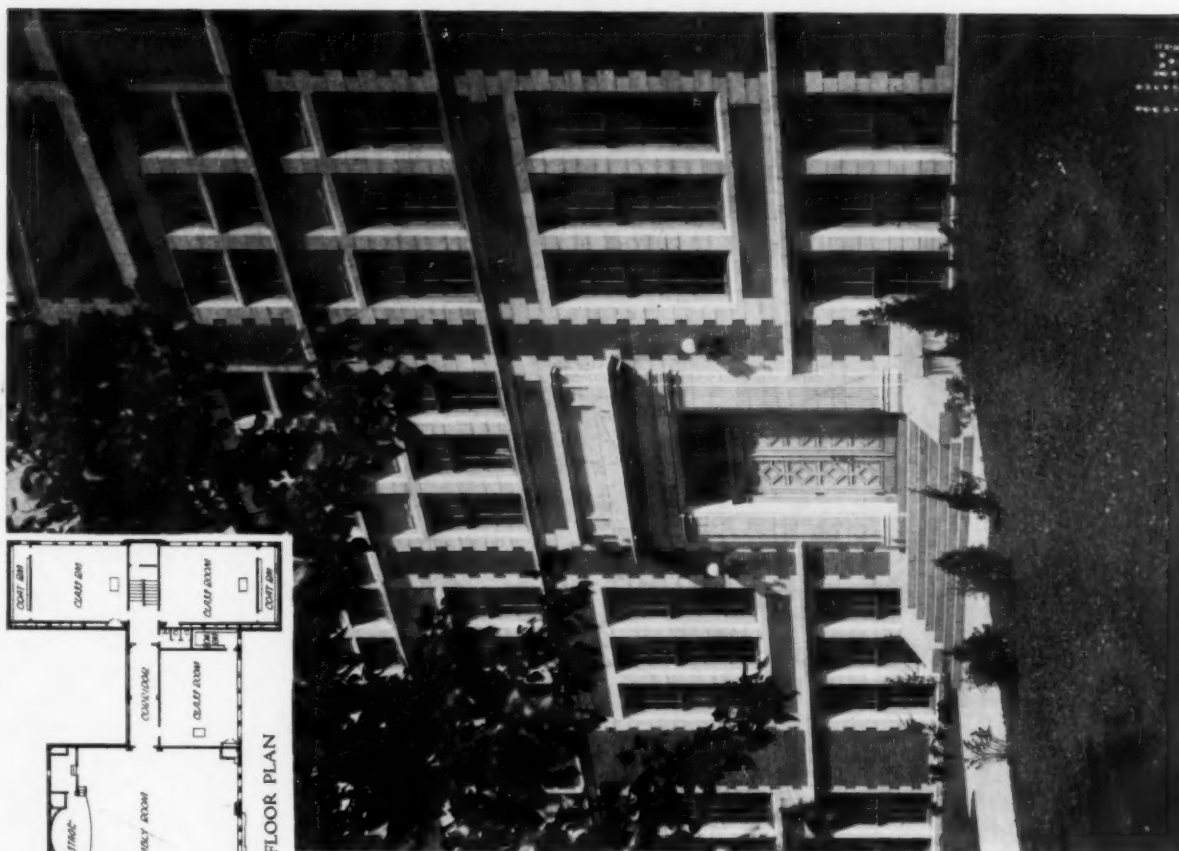
WILDER & WHITE, ARCHITECTS

22

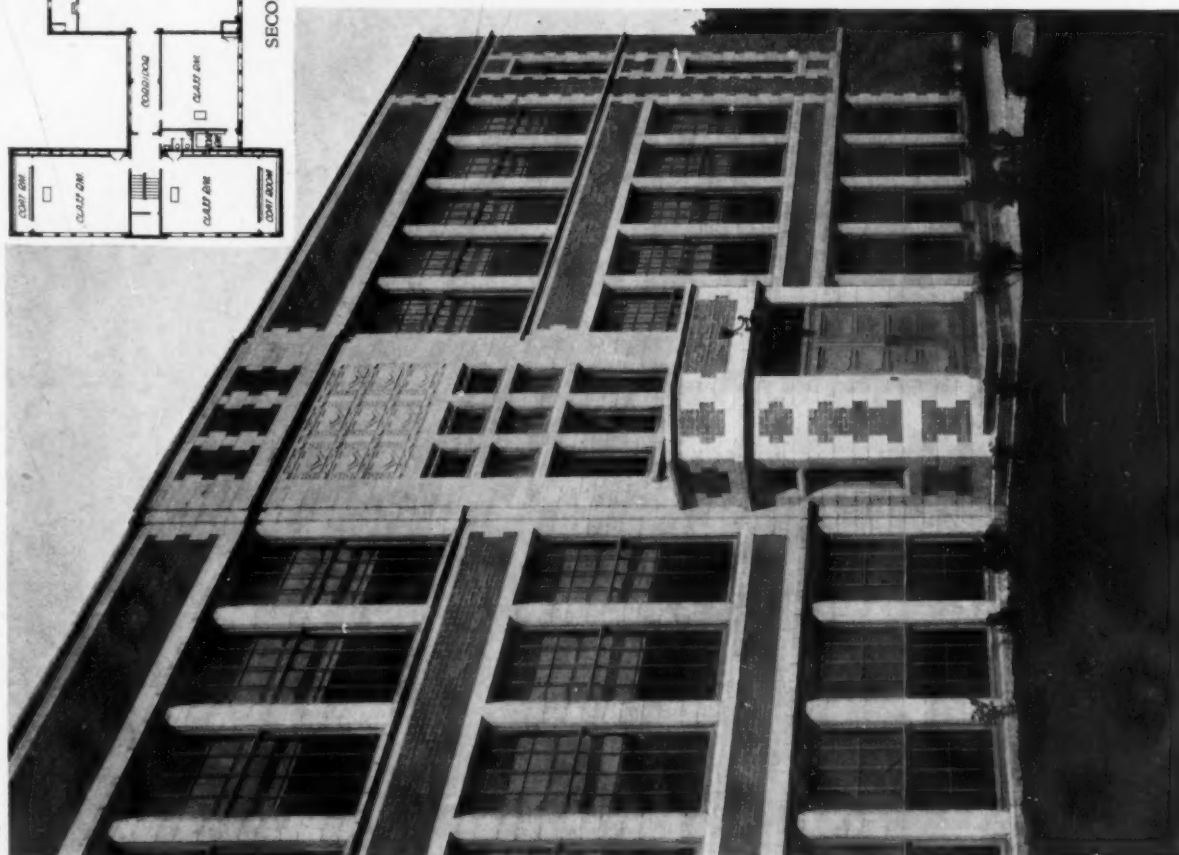
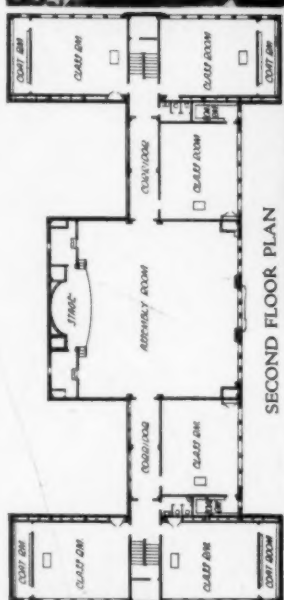
22-3-1891

22





MAIN ENTRANCE

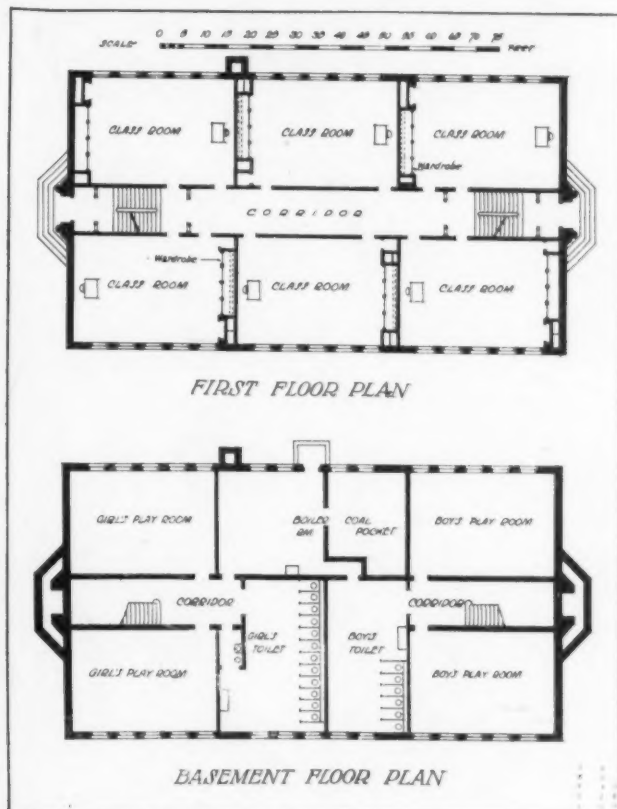


SIDE ENTRANCE

EVERGREEN AVENUE GRAMMAR SCHOOL, PLAINFIELD, N. J.

WILDER & WHITE, ARCHITECTS

10000  
10000  
10000  
10000

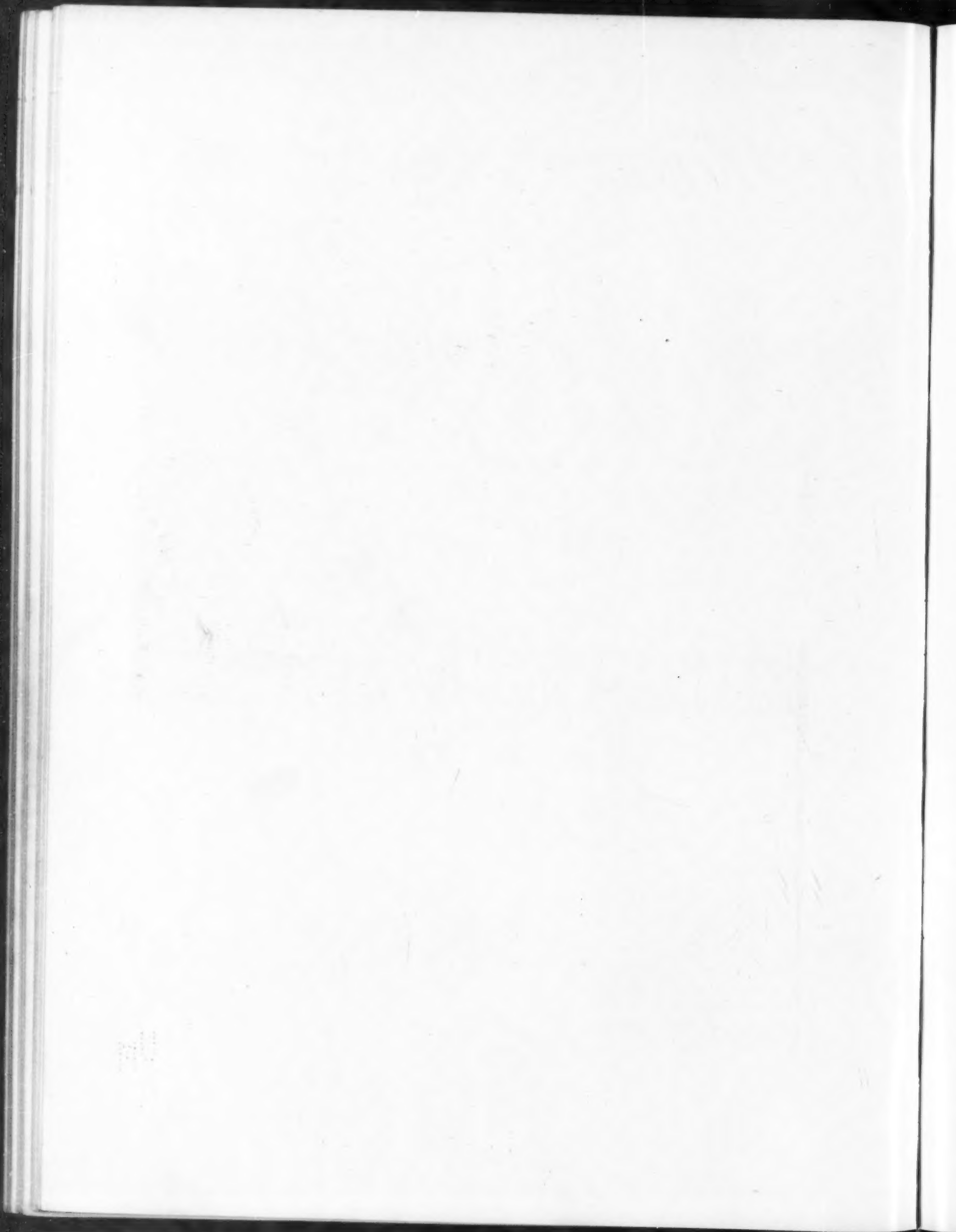


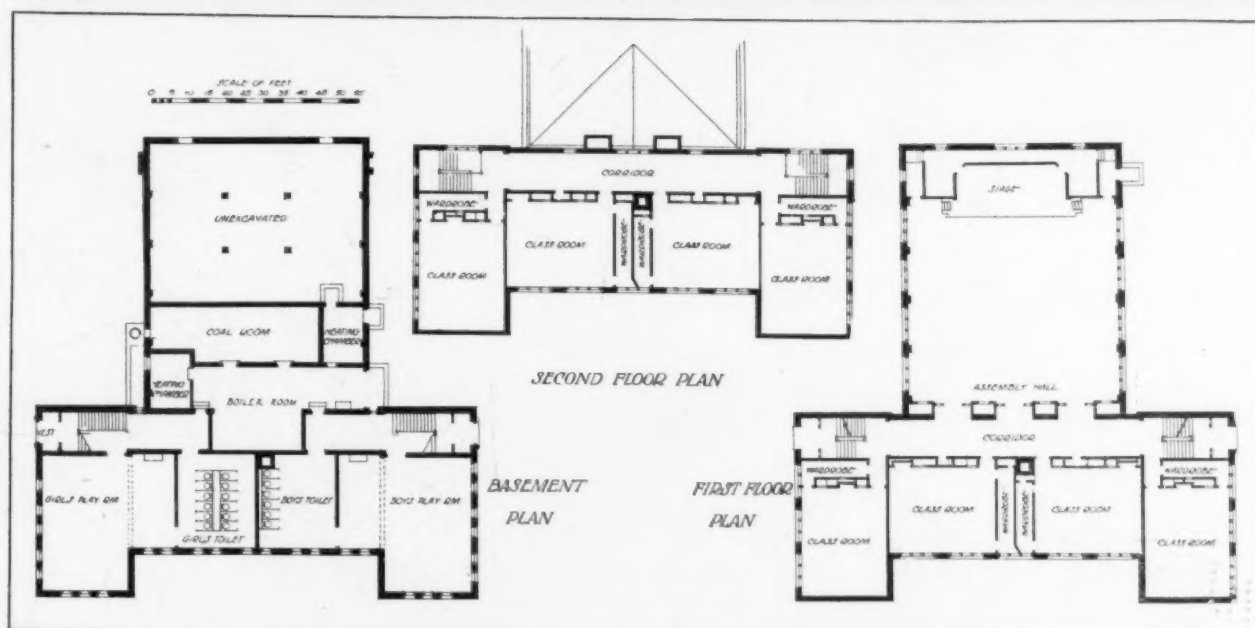
GENERAL VIEW OF EXTERIOR

OUR LADY OF LOURDES PAROCHIAL SCHOOL, JAMAICA PLAIN, MASS.

MAGINNIS &amp; WALSH, ARCHITECTS

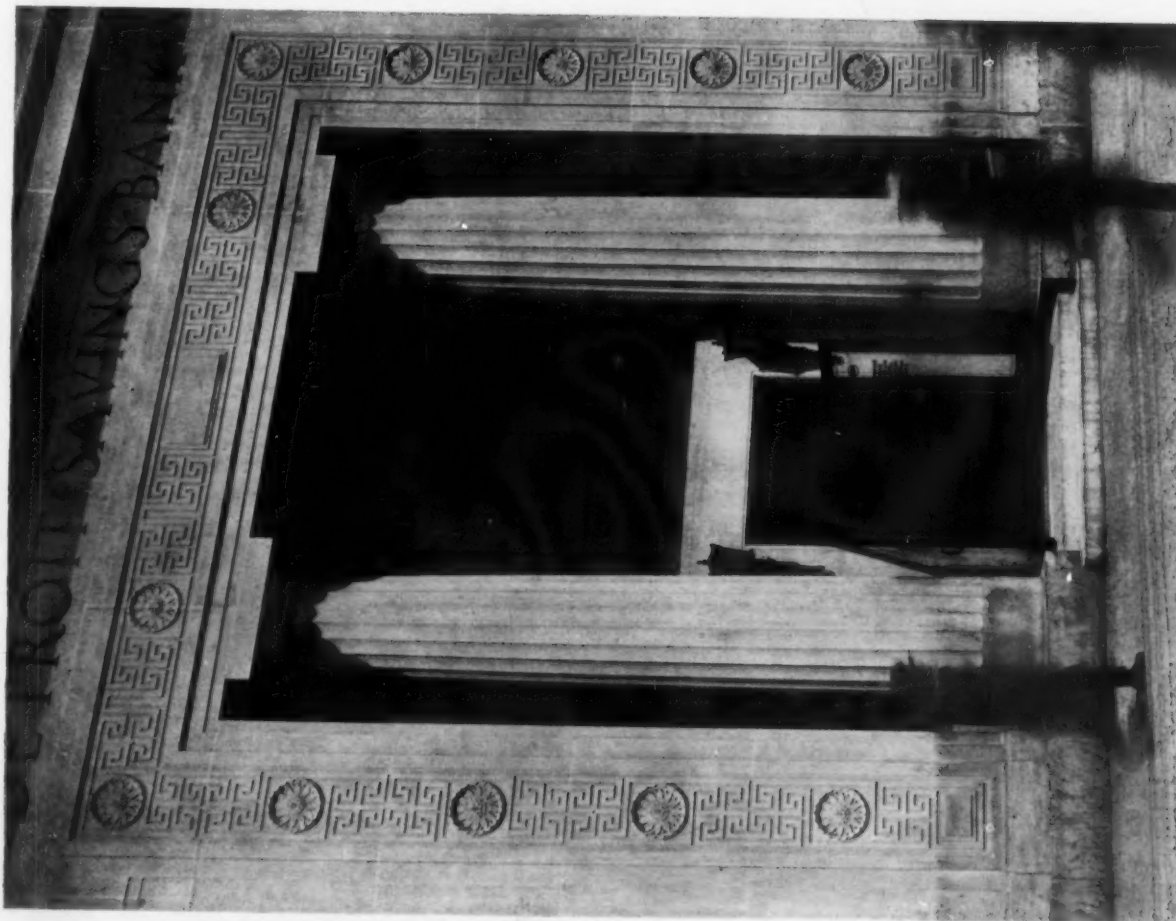
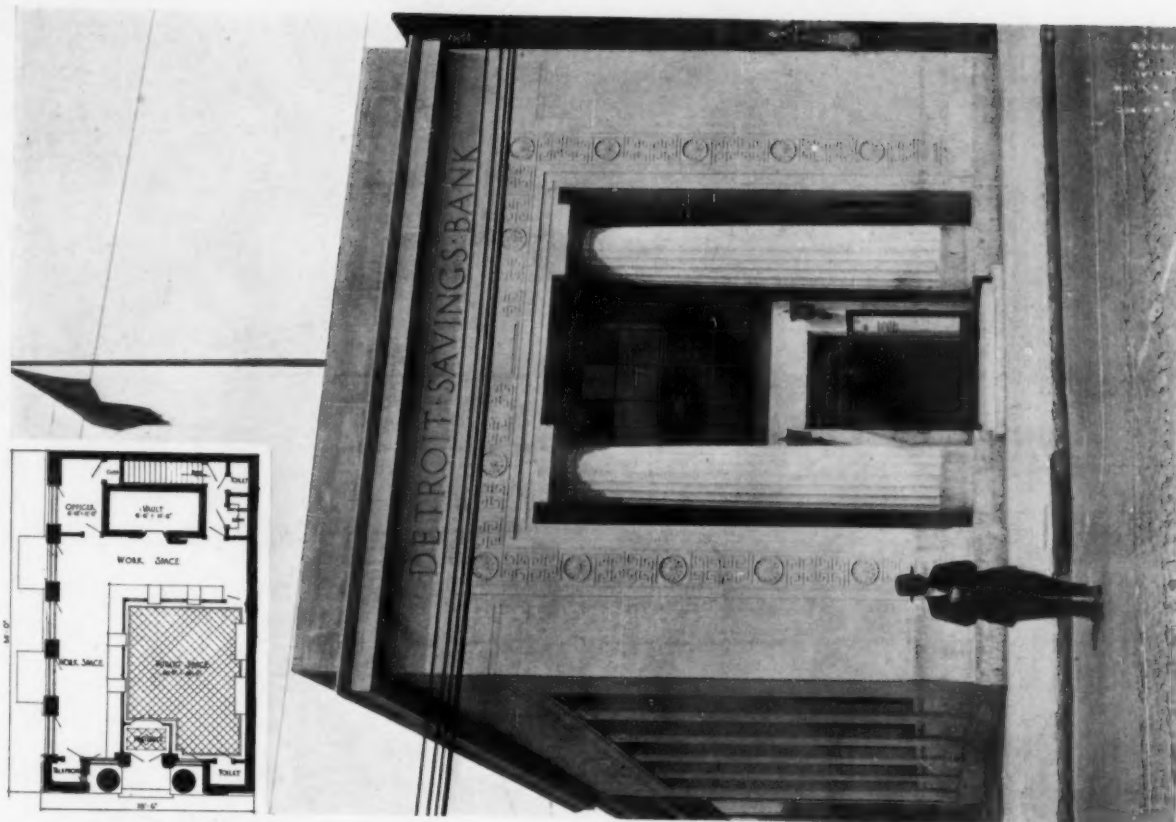












DETAIL OF DOORWAY AND GENERAL VIEW OF EXTERIOR

DETROIT SAVINGS BRANCH BANK, WOODWARD AND MILWAUKEE AVENUES, DETROIT, MICH.  
ALBERT KAHN, ARCHITECT

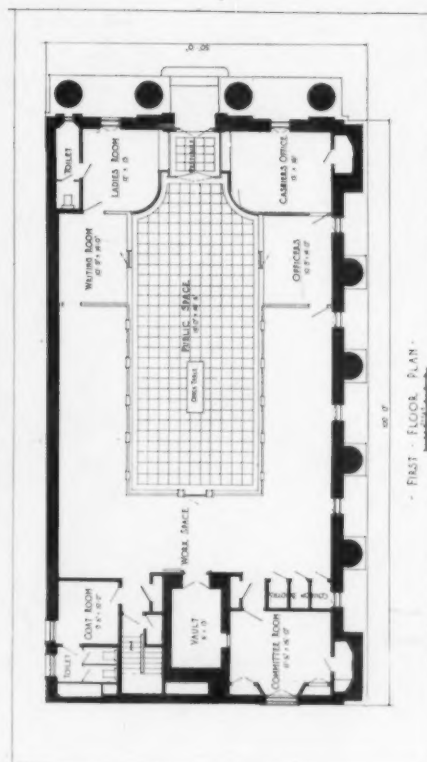
1000  
1000  
1000  
1000  
1000



WAYNE COUNTY AND HOME SAVINGS BRANCH BANK, WOODWARD AVENUE AND WEST GRAND BOULEVARD, DETROIT, MICH.  
ALBERT KAHN, ARCHITECT



GENERAL VIEW OF EXTERIOR





1000  
1000  
1000  
1000  
1000

# Domestic Architecture of California

## ILLUSTRATING THE INFLUENCE OF THE SPANISH AND ITALIAN RENAISSANCE PART II

By WILLIAM WINTHROP KENT

CLOSELY resembling the works of other Californian architects farther north, yet differing from them in some ways, is that of the more southern men who have practised in and near San Diego and its neighboring villages and towns. Climate, tradition and site, as well as available materials, influence somewhat the designs in this section as they do elsewhere. Wood is more expensive than in the earlier days, hence hollow brick and concrete are seen in place of it.

The interior court is often open on one side for a purpose, and when the house is near the sea, the lines are kept low and long, the roof flat, the walls fairly thick and with fewer openings on the stormy side toward the Pacific, while the court walls are more freely perforated.

At Coronado the house designed by Elmer Grey is placed to secure the best views and protection from the stormy ocean winds, the patio being only open on the garden side, this garden being so beautiful that it could not well be excluded by a fourth walled side to the court at the rear. In this house we see the Spanish characteristic of profuse

ornament concentrated about the doorways and windows in contrast with the plain blank walls.

Here, also, is the house of Gen. J. H. Pendleton, of more Italian than Spanish character, in an L-shaped plan of which the entrance is nearly central on the reentrant angle of the elevation on the side opposite to that shown.

At Pasadena and Los Angeles, and in certain houses of even more northern places, we find a strong development of Spanish colonial art; but the plans are often not influenced by the fact of great summer heat, inasmuch as they are usually built for winter residences for Easterners.

An interesting point in many modern Californian houses is the mingling of Italian with Spanish design in both mass and detail. Even in plan, also, is seen a retrospection to even older classic forms, although there is nothing very purely Greek about any which I have seen. But just as in Spain, where in the old work we can occasionally detect the Italian in plan and even in pronounced detail, so we see it here blended with the Spanish by moderns. Hence



First Floor Plan and View, House at Coronado  
Elmer Grey, Architect



Reginald D. Johnson, Architect



Houses near Oak Knoll, Pasadena

Marston &amp; Van Pelt, Architects

comes an added appeal to our interest, because from the mingled Spanish and Italian or classic, modified by locality, will possibly spring a style both practical and beautiful as we find it in the work of George Washington Smith, Irving J. Gill, James Osborne Craig, Reginald D. Johnson and other Californian practitioners. Fairly it can be said that it is almost here now, this simple new style, and it promises to grow, improve and possibly remain, although the latter is doubtful.

Oak Knoll, a suburb of Pasadena, is one of the most charming residential districts in California, for here there are few designs that affront and many that add to the varied natural beauties of the locality. Even on approaching it the influence of good design is seen in a group of houses situated on an estate which practically marks the entrance to Oak Knoll.

One of the best pieces of domestic architecture in Pasadena is the house of Mr. Rice, designed by the owner. There is a fine arcade and formal garden, pergola and pool, quite Italian, at the rear.

House of Gen. J. H. Pendleton, Coronado  
F. P. Allen, Architect

In South Pasadena, Dr. Behr's house suggests the Villa Paradiso at Genoa, but only because of the loggias which are a necessary feature for views and coolness in this lowland situation. Near by the Coppell residence, illustrated in the preceding article, shows in plan no attempt to shut out

the heat (which its walls help to do), because it is a winter home; but the contrast of profuse ornament with a firmly hand-troweled, plain plastered wall is one of its many beautiful features. It shows that certain principles which Mr. Goodhue emphasized at the San Diego Exposition, he pursues in later designs. The Dater house at Montecito has the good qualities of both the Spanish and the Italian school. It is hard to analyze the great charm of this house, but the logic of its plan is perhaps one strong factor added to its quaint suggestion of the greater peasant house of northern Italy, as we find it in old prints and in reality.

The old Country Club at Montecito, now remodeling for a dwelling, is notably picturesque and yet formal enough for its original purpose. Here the

House of Dr. Behr, South Pasadena  
Reginald D. Johnson, ArchitectHouse of L. G. Rice, Esq., Pasadena  
Designed by Owner





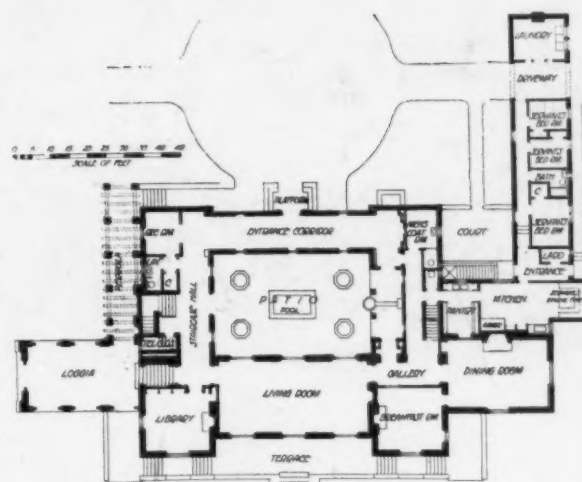
View from Approach



View from Garden

House of Henry Dater, Esq., Santa Barbara, Bertram Grosvenor Goodhue, Architect

Spanish court is of an unusual design in its wall of a polygonal plan, making one of the best façades in Montecito; but the architect has done equally good work in the patio elevation toward the pool and entrance hallway for Mrs. Oakleigh Thorne's house just completed. This is evidently based on Vignola's Casino at Caprarola, but not as successful in its elevation toward the road.



Main Floor Plan

Not far from Santa Barbara Mission is the house of Mr. Vaughn, with fronts on street and garden, where a terrace is reached from low windows. The second story pergolas on the flat roofs of the wings give it an individual character. Adjoining is Mrs. Dennison's house, with an entrance from the court in front, although the rather coquettish niches in the street wall somewhat destroy the

Living Room in House of Henry Dater, Esq., Santa Barbara  
Bertram Grosvenor Goodhue, Architect



The Dennison House, Santa Barbara



The Vaughn House, Santa Barbara

Messrs. Ray &amp; Soule, Architects

straightforward quality of the rest of the design. Here the climate only suggested a cool porch or two in the rear, a walled garden and pepper trees for shade.

The garage and gardener's cottage by James Osborne Craig, and the house for Mr. George

Washington Smith speak so eloquently of picturesque quality, that it is only necessary to add that in them both is the germ of hope for future Californian architecture. The former will eventually have a walled motor courtyard added in front of the two motor doors of the plan. The slope of the ground and the existing, fine large trees had much to do with the arrangement of the plan.

Mr. Smith's house needed no windows on the west or entrance front, hence a beautiful expanse of blank wall accentuates the entrance and the simple windows above, while the garden and garage wall and gate prolong the lines of the elevation. On

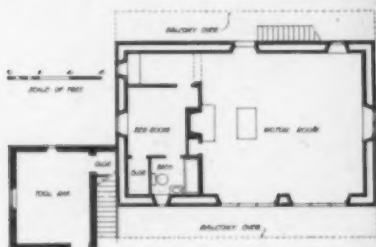


The Taylor House, Claremont

Louis C. Mullgardt, Architect

the east and south the garden and the main living rooms are in the full sunshine so necessary in this part of California in winter, the dining room enjoying sunlight even at midday, while in summer it is in shade. The circular stair is properly a small one and

planned for economy of space, as it leads only to two rooms and baths. The studio has a high, north window, and a south window opens on the terrace. This plan and elevation are based on Andalusian Spanish of the twelfth century, as closely, Mr. Smith says, as modern life will admit, and has proved to be practical and of great charm for



Lower Floor Plan and View, Gardener's Cottage and Garage of Mrs. Theodore Sheldon, Santa Barbara

James Osborne Craig, Architect







House of Mrs. Oakleigh Thorne, Santa Barbara  
Francis W. Wilson, Architect

Southern California. The design is primitive, relying on form, mass and line for its beauty, and I know of no more delightful dwelling for its situation nor one which so invites by its plan and general design. Simplicity is here properly used as a foil for good detail both inside and out.

In Claremont, on San Francisco Bay, the Taylor house is of a fine type. Of all modern Californian designs for large country houses of a distinctly original sort, Mr. Mullgardt's are on the whole the most satisfactory. The promise of his work in "The Court of Nations" at the San Diego Exposition is well fulfilled.

This house of Mrs. Taylor, based on Spanish motives, might be called Thibetan. It is not unlike the temple of the Grand Lama and Lhasa, but it is not Thibetan except as the Thibetan has a Chinese air, which faintly pervades this hillside villa and its gardens. These being on a hilltop do not lose their privacy, although enjoyable also by the passerby.

So, in California, as elsewhere, we see how much climate, site, materials and tradition influence both elevations and plans. Un-

doubtedly the simplicity noted is, as Mr. Goodhue has written me, in a measure the result of trying to design to meet the lack of skilled labor, and proves often a blessing instead of a hindrance to art. Certainly it is true that where tradition is not too much neglected and materials are sensibly employed in a logical plan, no great harm can come from the lack of highly trained craftsmen in country-house work. This is proved in Bermuda and elsewhere.

North of San Francisco the Spanish and Italian vein runs out, and in some places the architecture of an entire village reminds one of New England. What little foreign influence is traceable is not of as great importance as that in the southern examples; but as wealth increases it is probable that also the upper part of this wonderful state will see considerable improvement in design, to which both Spanish and Italian characteristics will somewhat contribute. The seven hundred and eighty miles of California nevertheless show a consistency in architectural development and a vigorous local style unapproached in any large section.



Entrance Hall, House of Mrs. Oakleigh Thorne, Santa Barbara

# Interior Decoration

## ENGLISH FURNITURE OF THE WILLIAM AND MARY PERIOD

By CARL S. JOHNSON

THE forms of both architecture and furniture that immediately succeeded the Renaissance have a peculiarly interesting quality in practically all countries where the inspiration of the Renaissance was felt. The period, which is generally classified as Baroque, was characterized principally by a reaction from the classic feeling and orderly development of the Renaissance; it was an expression of the Romantic idea, and before its full exuberance was developed, and it still remained under the conservative influence of the Renaissance, much good work was done that has a wide appeal for us of to-day and is capable of furnishing valuable precedent for much modern work.

In England, particu-

larly, is a study of the Baroque both interesting and profitable. With the restoration of Charles II there was provided an opportunity for the display of fashion, gaiety and sumptuousness that had previously held sway on the Continent. The classic spirit of the Renaissance school was, however, strongly upheld by such architects as Wren, and the general influence on architecture was, as a consequence, dominantly classic. The Baroque tendency exhibited itself only in the enrichment of classic forms of doorways, mantels and stairways. The sizes of rooms were increased and the ceilings made higher; paneling was designed to accord with this larger scale; the detail of mouldings was vigorous, and the interest in



Detail of Pelican and Whirling Scroll in a Fine Example of Grinling Gibbons' Work



Dining Room in Residence of Mrs. S. R. Hitt, Washington, D. C.

Illustrating a modern treatment of early eighteenth century English type. The broad panels, overdoor ornamentation and wood carving are characteristic of the period. The furniture is a variant of the later Queen Anne style

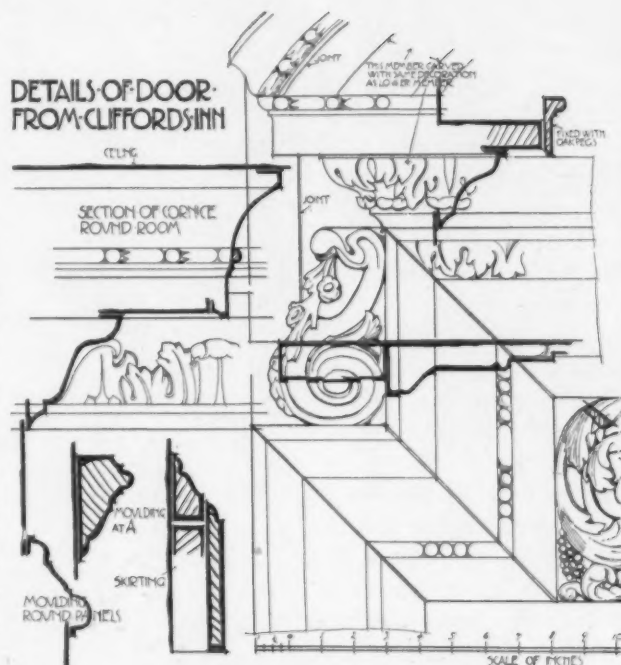
John Russell Pope, Architect



wood carving as decoration increased, bringing about the use of softer and more suitable woods for carving than oak, culminating in the marvelously adroit and decorative carving of Grinling Gibbons.

The interiors of this period are characterized by great stateliness, but withal giving a comfortable, homelike appearance. The walls were boldly paneled, with careful thought given to the spaces to be filled; the mouldings were frequently enriched with carving and in many cases decorated with gilding; the ceilings of the finer houses were painted with gay, mythological subjects, the most famous decorator of which was Verrio, an Italian who came to England at the wish of Charles II. The many great country houses built in this period reflect the social tendencies of the times. The old English hall where family and servants assembled gave place to stately drawing rooms, and the servants were now housed in separate wings or on the upper floors and participated in none of the family life.

The restraint which was characteristic of the



Details of Door from Clifford's Inn, London, Showing Vigorous Character of Mouldings



Detail of Doorway and Paneling from Clifford's Inn, London, Illustrating the Baroque Influence in Broken Pediment and Ornamented Mouldings

architecture is, however, not found in an equal degree in the furniture. Under the royal patronage, artists came from the various European countries, notably France, Portugal and Holland, and brought with them the traditions of design that had developed on the Continent. With the accession of William III many craftsmen came from The Netherlands, either at the direction of the king or of their own accord, in expectation of receiving favor from their compatriot. Despite the Dutch origin of William and the many workmen from Holland, the dominating influence on the furniture of the period is not Dutch, but French. This is not so evident in the detail as in the form; some of the early stools, benches and chairs of the time show very close relationship with the forms developed in France during the reign of Louis XIV, and for the student of furniture provide an interesting example of the international relation of style.

This was particularly the age of walnut; the nature of the designs for furniture was such that a softer wood than the previously popular oak was needed, the intricate turnings that were so often used were not





A Triple Arched William and Mary Chest with Twisted Legs and Typical Stretchers

practical in oak because of its tendency to split, and the cut-out patterns of stretchers also were more easily worked in the softer wood. The wood was, perhaps, more specially valued for its pleasing color and grain, and this developed the extensive use of veneering, which is probably the outstanding characteristic of William and Mary furniture. Thick saw-cut veneer was universally used with a great appreciation of the beauty of the wood's natural grain. Much of the decorative quality of the furniture of this period comes from the manner in which the various veneers were applied. The larger central areas of such parts of furniture as drawer fronts and cupboard doors were veneered with specially chosen wood, displaying the choicest figure, and ranging in tone from black and warm brown to deep golden yellow; bordering the larger panels were often broad margins of veneer "cut on the cross," so that the grain ran transversely; in other cases, particularly drawer fronts, two narrow strips of veneer, selected for very fine grain and similarly "cut on the cross," were placed so that the grain in each was diagonal and the two at opposite angles,

thereby giving an effect similar to a feather or herringbone pattern. The mouldings were similarly worked in thick, saw-cut veneer with transverse grain.

Beech was used extensively as a substitute for the more expensive walnut, and other woods had certain popularity, too, such as olive, yew, cedar and sycamore, but walnut was greatly predominant. In many of the pieces various woods were used; walnut was reserved for the important positions where advantage could be taken of its wonderful color and figure, and beech and less expensive woods used for turned legs, finials and drops, which parts were painted black and varnished, thus lending variety and interest to the whole.

The favor with which fine figured wood was looked upon was instrumental in developing a class of workmen who were expert at imitating the grain of walnut in cheaper woods through the use of paint, the whole being finished in varnish.



High Back Arm Chair of William and Mary Period in Hampton Court Palace. Upholstery is Genoa Cut Velvet

The largest and most important piece of furniture developed at this time was the bureau cabinet, an example of which, unfortunately, we are not able to illustrate. The lower portion consisted of a chest of three or more drawers set upon large and squat globular feet, and surmounted by a sloping hinged flap, which when swung out and supported by slides provided space for writing, similar to the writing desk so popular in later Georgian times. This bureau portion was generally very simple in treatment, the skill of the designer and artisan being expended on the upper portion, which was more shallow than the lower and was fitted elaborately for use as a cabinet. It was enclosed by a pair of doors with rounded heads to conform to the arched head, similar to that on the chest shown on page 159, but usually composed of but two curves. The doors stood open like an altar triptych and disclosed an ingeniously arranged interior consisting of concave front drawers at the bottom, and a central cabinet with a door divided from the surrounding space by delicately turned pilasters; often there were small niches containing carved and gilded figurines, the whole constituting a very impressive and decorative piece of wall furniture.

Chests and cabinets of various types were made in great quantities during the period. There was great interest taken in decorative china, following

the example set by the queen, and this with the further interest in the wares of the Orient, stimulated by the trading of the Dutch East India Company, was undoubtedly directly responsible for the great demand for cabinets.

The chests of drawers took several forms, one being the chest-on-chest; some of these were most elaborately made with shaped drawer fronts making a series of three or four continuous niches across the face of the chest and extending the full height, culminating in the top drawer in a series of hollowed out domical spaces. The more popular type of William and Mary chest was made up of four or more drawers supported upon a five- or six-legged stand, similar to the examples shown on pages 159 and 160. Their tops were made arched in two or three motives, with the number of legs corresponding, although many had a simple flat top with slight moulding or in some cases a frieze and cornice, the frieze in many cases being arranged as a concealed convex drawer.

The chairs of the period show vigorous qualities of design and likewise the first intended use of upholstery in English seating furniture. Great armchairs that held their place against the dignified chimneypieces of Wren were beautifully made with high backs, "wings" and scroll arms, and upholstered for the most part in *gros* and *petite point* needlework.



Walnut Veneer, William and Mary Chest with Marquetry Inlay



Walnut Veneer "High Boy" in William and Mary Style

# ARCHITECTURAL & BUILDING ECONOMICS DEPARTMENT

C. STANLEY TAYLOR, *Associate Editor*

## The Co-operative Financing of a Group of Homes

THE unusual conditions of building and real estate markets to-day, together with the element of high rentals, are operating to direct interest more than ever into the channels of co-operative financing — an activity almost unknown in this country before the war. This condition is particularly true in the dwelling field, and to a certain extent it has been applied successfully to make possible the construction of apartment houses and some inexpensive residential developments.

Recently an entirely logical but somewhat unusual plan of co-operative financing has been developed in the field of medium cost houses, and as the operation has already been successfully financed with full intention of erecting the houses this spring, it may be of interest to architects in various sections of the country to know how one architect somewhat indirectly brought about the development of an interesting line of work for his office. The casual development of this idea is somewhat interesting, and came about in the following manner:

Not many months ago the architect in question was lunching with a business friend in the downtown section of one of our largest cities. After a time the conversation drifted to the subject of high rentals and to the increasing interest of many apartment dwellers in the possibility of owning attractive residences in suburban sections. The final advice of the architect given in a semi-humorous vein was to the effect that his friend would do well to get together a group of interested associates and build up a small community of attractive and not over-large homes. The subject was dropped here, and the architect gave it no further thought.

About two weeks later, however, he was surprised to receive a telephone call from his friend making an appointment for the purpose of discussing the possibility of developing a small residential community. During the course of the second conversation it developed that the business man had spoken of the matter to a friend of his — a real estate broker — dealing in suburban property, and still in a casual vein had been informed of an attractive piece of acreage containing about ten acres of land located in one of the fine suburban districts near a country club and available for quick sale at a very low figure. Putting the two ideas together the business man made inquiries and found that several of his friends would certainly be interested

in owning small homes in a congenial community.

A third meeting, this time with the real estate man present, resulted in the decision to attempt definitely carrying out a co-operative project.

### Method of Organization

After analyzing the situation carefully it was determined that if thirty people could be found, each willing to put up \$7,000 in cash in order to obtain an attractive home, the duplicate of which could not be purchased in the chosen district under \$18,000, the project could be worked out. Through friends and the activity of the real estate man, thirty people were found in about two months' time. Meanwhile an option had been taken on the land in question, and a brief prospectus had been written showing how it was intended to carry out the project. As each person became interested in becoming a partner in the operation, a simple agreement was signed and \$1,000 provided in cash, so that at the end of this period \$30,000 — the price of the land — was in the bank.

The next step, however, to make it possible to carry out this operation was to obtain a fairly liberal mortgage loan. The architect prepared a water-colored sketch showing the proposed layout of the property, together with perspectives and floor plans of three types of houses to demonstrate the general character of the homes, although no two were to be alike in general appearance. Armed with these drawings and the agreement by thirty responsible persons to carry out the operation, the real estate man took up the matter with several financial institutions, one of which agreed to make the desired mortgage loan. Immediately, then, the property was purchased, all cash being paid as required in the transaction in order to obtain the favorable price.

To-day the property has been purchased and agreement has been made as to the construction and permanent mortgage loan. In following paragraphs the figures will be given, together with the general plan as it is to be worked out.

The plot of land in question contained ten acres, and it was decided that by placing six houses to an acre, five acres would be ample for the thirty houses which are to be constructed. The balance of five acres was taken, having in mind an increment in value incident upon the locating of thirty attractive homes at this point.



The following is a tabulation of the cost of the operation, showing how \$7,000 from each of thirty persons has made this development possible:

Land — ten acres at \$3,000 .....	\$30,000
Improvements — streets, lot grading and utilities, \$4,000 per acre .....	20,000
Cost of houses — thirty at \$12,000 .....	360,000
Total cost of development .....	\$410,000
Blanket mortgage from financial institution .....	200,000
Total net cost of operation to thirty persons .....	\$210,000
or \$7,000 from each in cash.	

The mortgage which was obtained was for \$200,000, representing less than 50 per cent of the cost of improved land and houses. This mortgage applied only to the five acres of developed land, together with the houses thereon, and was taken at 5½ per cent, a one-thirtieth part being chargeable against each house as a first mortgage, the individual owner giving bond to this amount. The period of the loan is for five years. The expense of obtaining the loan was met by joint contributions by the principals, amounting to very little for each person — in this case about \$100 each.

At a meeting of the thirty principals a committee of five was appointed to supervise in a general way the carrying out of the work, this being done to make more flexible the relations with the architect and contractor.

#### Advantages of Co-operative Building

In analyzing this plan it is evident that the advantages to be gained are somewhat numerous and not all financial. From a financial viewpoint there is, of course, a certain economy in building a comparatively large group of houses, as the purchase of material and necessary service for such a group shows an appreciable saving per house over the cost of building a single home. A second financial point is the certainty that the five acres of land which is not built upon will be increased materially in value when this nucleus of an attractive community is complete. To give each of the principals the advantage of this condition, the five acres were divided into thirty lots, after streets had been mapped out, and one lot given to each of the thirty principals. So that there would be no question as to the selection of lots, each was numbered and each principal drew a numbered slip from a closed box, showing which lot he was to receive.

From the viewpoint of each of the principals in this transaction, in addition to the evident financial benefit of taking advantage of group buying, together with the ownership at lot cost of an attractive residential plot which will rapidly enhance in value and will be readily salable, there are the numerous advantages of having an attractive home built to suit the tenant: each man knows

who his neighbor will be, and the character of the development is standardized from the outset. It has already been proposed to form what will be known as the community club, having as its purpose not only direct assessments for the upkeep of streets, lawns and similar work, but also considering the possibility of building tennis courts and similar community facilities. There is also available the country club, so that an almost ideal condition has been created and one which has a tendency to offset considerably the high cost of rentals or purchasing under present conditions.

An agreement has been made through which no principal will sell a house for a period of five years until it has been offered to the community club at cost price for redisposal, and in this manner any tendency toward immediate speculative profit on the houses has been eliminated and the character of occupancy guaranteed for the first five years, after which the standard of the community will undoubtedly direct its growth properly.

This is an interesting incident of the legitimate development of work on the part of an architect in the course of which all parties to the transaction receive direct benefit. There is no question but what this plan can be carried out in practically any residential community to-day. The minimum number of houses which should be built is ten, as it is estimated that at this point in the construction of houses costing approximately \$12,000, a noticeable factor of economy in material purchase and construction cost can be realized.

It would seem from all indications that rentals are to go still higher in the fall of 1920, and with the great dissatisfaction which is being shown for this condition, together with the fact that many persons are in a position now to invest money in a home, it is evident that thousands of homes in this class will be individually built or purchased during the next two years.

There are numerous advantages in the co-operative method of home development which have not been outlined in the foregoing article, but which will be evident upon consideration of the question, as it will have local application. By following the steps which are taken by the various interested persons as described in this article, arrangements can be made to carry out such a project more easily than would at first seem possible.

Usually in considering a group of twenty-five or thirty residences purchased individually, there is a speculative profit to be considered which will probably be 15 or 20 per cent of the cost of land and building. Thus by grouping together in a co-operative venture there is a considerable saving over individual purchase, and a definite saving over individual building.

## The Situation Regarding Building Loan Money

IN several cities where during the last year money for building construction and permanent mortgage loans has been available in considerable quantity on conservative appraisals, there seems within the past month to have been a reduction. There are not so many advertisements in the papers offering money for mortgage loans, particularly for building money; and from Middle Western cities statements have been received from builders to the effect that they cannot carry out expected operations because of the apparent shortage in the building loan market.

In order to get the bankers' viewpoint on this subject, we asked an official of one of the important national banks of the Middle West what might be the reason for this condition, and whether or not it was caused by lessening confidence in the building field. We were interested and somewhat relieved to learn that any curtailment of building loan and mortgage funds is not due, at least on the part of financial institutions, to lack of confidence in buildings as security, but to the fact that "there are greener fields elsewhere."

Large sums of money which normally might be available for construction and permanent mortgage loans are being directed into the richer and more active fields of commercial credit. Business expansion in large and small units is being carried out in a manner probably never before known, and usually these ambitious programs (which incidentally often entail business construction) must be financed through the assistance of banks. Commercial paper is being presented for discount in considerable quantity, and short term loans of the various classes are greatly in demand.

We must digress for a moment to explain briefly that the Federal Reserve Bank is essentially a bank which loans to banks, taking as security the security which the bank in turn has taken in making its loan, but charging a lower percentage than the bank charges its customers. Hence one of the legitimate and sound channels of profit in banking.

Short term loans of various types are accepted by Federal Reserve Banks as security, whereas real estate loans are not considered in this class. Therefore, to a great extent, the activity of banks to-day does not include real estate financing to any greater extent than is necessary. We have, therefore, to depend largely upon individuals, estates and corporations other than financial, for real estate mortgage funds which are in the nature of an investment rather than a banking proposition.

It is evident, therefore, that the soundness of building collateral is not questioned beyond the normal conservatism regarding loaning against

increased cost of construction. On the other hand, from a casual analysis, it would seem quite possible that the financing of commercial expansion will soon reach a point where it is not deemed safe to continue farther; and in that case considerable money will probably be redirected into the channels of financing building construction. In the northeastern section of the United States there is evidence that bankers are shutting down somewhat on commercial short time credit, particularly where it is directed toward individual business expansion. Therefore, it is logical to expect developments in the building loan field toward the end of this year.

There is little doubt that many of the ambitious building plans now on the architects' boards must be abandoned through lack of basic financing, and, unfortunately, but apparently, through lack of building material or too excessive cost. The abandonment of a number of large projects, rumors or knowledge of which have had a tendency to inflate the market for materials, will be beneficial to the general building trade and to architects in general in that it will release materials of various classes, which in turn will make possible the completion of many of the smaller operations.

The return of the railroads to their respective owners brings with it a promise to favor the transportation of building materials which at present are far down on the preferred list. This transportation question is one of the chief causes of the difficulty in getting building materials, and unfortunately affects the financing of building operations, as it makes uncertain even the most careful cost estimates. A direct example showing a reflection of this condition may be quoted.

Careful estimates as to the cost of a building—all bulk materials being covered by dependable quotations and in some cases by written agreement—were made and delivered to a financial institution which was seriously considering making a building and permanent loan to meet the requirements. Two of the dealers who had agreed to furnish certain necessary materials in large quantity stated that it would be impossible for them to fulfil contracts, as material was no longer available. Upon further investigation it was found in one case, at least, that the material which had actually been in storage at the time had been sold to take advantage of an increased price, and the dealer was not at all anxious to carry out the contract. This unsettled condition resulted in a refusal of the financial institution to consider financing until prices were better stabilized, and here at least is one job which must be given up until more favorable conditions are developed.

## A National Bank Sets a Precedent in Financing New Housing

**A** FEW months ago we seemed to have reached a point of saturation in considering the industrial housing problem. The press was flooded with theoretical and practical articles on the subject. Many solutions were offered, some of them practical. Miracles in the production of low-cost houses for industrial employees were attempted and failed. It was found by practical experience that with labor and material costs as they are to-day, the minimum sized, five-room frame house with cellar costs approximately \$4,000, regardless of plan.

The industrial housing problem is with us to-day, however, greater in volume than ever before, owing not only to industrial expansion requiring additional housing for the animate machinery of industry as well as the inanimate, but to the fact that home building has not kept up even with normal demand; while to-day the demand for homes among the middle class may be fairly termed abnormal.

The standard of the average home demand has been considerably raised by conditions of better living. The rapid increase in the cost of building materials and labor has greatly disturbed the past balance between finance and building.

We find, therefore, a condition where new channels for the obtaining of building and permanent mortgage loans are being eagerly sought, and many theoretical solutions of this problem have been advanced. These include not only financing by the Government in a manner similar to the Farm Loan Banks, but the organization of mortgage companies selling bonds to the general public. The theory has also been advanced that the saving methods induced by Liberty Loans should be considered as a vast money producing machine, the power of which could be turned to the provision of homes through Government or possibly through private initiative. In the form of partial equity financing this has been done rather successfully

in the Middle West, where many mortgage companies have been formed, selling bonds to raise capital, and directing this money into the form of second mortgages or land contract purchases, which have made a flexible financial condition and greatly assisted in providing homes.

It has apparently remained, however, for the

### *The "Holyoke National Way" of Solving the Housing Problem*

This bank will make a construction loan to any approved builder, for any family in Holyoke, South Hadley Falls, Chicopee, Chicopee Falls or Willimansett, who have One Thousand (1,000) Dollars on deposit in its Savings Department, for the six months preceding the decision to build.

The lot must not be less in size than 50 x 120 or 60 x 100 (this will give plenty of room for a garden). The house and land to cost not less than Five Thousand (5,000) Dollars, with all necessary modern improvements.

If a two-family house is desired, a deposit of Two Thousand (2,000) Dollars, or thereabouts, must have been on deposit for the same period, and the house and land to cost not less than \$8,000.

The money on deposit with us is to be used to purchase the lot or start the house, or both. The location must be subject to our approval, and all houses connected to sewers.

All applicants must be American citizens, or at least have their first papers to become such.

For this purpose we will use

#### ONE HALF MILLION DOLLARS

After the house is completed and approved, we will make an effort to get you a Savings Bank loan for 50% of the actual cost of house and lot. The difference between the Savings Bank loan and the cost of the property, less amount of your own money used, we will carry for you at 6% interest, payments to be made weekly, or monthly, as may be arranged.

#### EXAMPLE:

##### WHILE BUILDING:—

To buy lot and start house . . . . .	\$1,000 of your money
To complete house . . . . .	4,000 of our money
Total cost of property . . . . .	\$5,000

##### WHEN COMPLETED, LOAN WILL STAND:—

Savings Bank loan 50% of cost . . . . .	\$2,500
Your money to start house . . . . .	1,000
What you will owe us to be paid in weekly or monthly payments . . . . .	1,500
	\$5,000

It is not usual for a National Bank to make loans of this kind (though permissible) but this Bank was formed forty-eight years ago, to be of benefit and convenience to the citizens and business interests of this vicinity, and in the present crisis, we feel that we would not be doing our duty as a bank, if we did not come forward in this time of extreme emergency, and we do not know of any better way to be of service and help to this community, than to use the money, (about 6% of our deposits) that was saved here, belongs here, and should be invested here, for the benefit and happiness of those who saved it.

The money which will be used for this purpose is yours, and held by us as your Trustee, to be invested wisely for your account, and we know of no better investment of those funds, than in a home of your own, for the benefit and comfort of yourself and family.

The one half million dollars which we will loan, together with the 20 to 25% of your own savings, and the 50% loan from the Savings Bank should help the community to the extent of

#### ONE AND ONE-QUARTER MILLION DOLLARS as follows:—

Investment of your money . . . . .	\$ 250,000.00
Investment of Holyoke National . . . . .	500,000.00
Total from this Bank . . . . .	\$ 750,000.00
Savings Banks Loans . . . . .	500,000.00
Total . . . . .	\$1,250,000.00

### **HOLYOKE NATIONAL BANK**

HOLYOKE, MASS.

by its Directors

DWIGHT H. IVES	JAMES H. WARRLEN
HOWARD F. METCALF	ALDO A. CORBURN
GEO. C. GILL	



Holyoke National Bank of Holyoke, Mass., to set a precedent in directing additional funds into the channel of greatly needed homes. We term this a precedent, as to our knowledge this method of financing is quite new and unusual for national banks.

The general plan by which this bank has made available a first appropriation of \$500,000, which will result in the construction of one and one-quarter million dollars' worth of homes, is given in the attached reproduction of a descriptive sheet issued by the bank. It will be noted that this plan is available for clients of the savings department of the bank. Apparently the fact that a savings account has been carried is considered a good guarantee of character. The bank undertakes to obtain a first mortgage loan from other local financial institutions and to make it possible for a client to own a house if he has 20 per cent of the cost of land and house available for investment

in this manner. The balance of necessary money is repaid to the bank in weekly or monthly payments, thus making it comparatively easy to own a new house.

This plan undoubtedly meets squarely the situation which has held back the construction of homes. Mortgage money has been fairly easy to obtain for 50 per cent of the cost of building a home; but it has usually been found that the prospective home owner has only about one-half the necessary equity and is unwilling to pay the exorbitant demands for second mortgage money made by private individuals, sometimes reaching as high as 20 per cent of the total cost.

We see no reason why financing cannot be provided in many sections of the country in this manner, and the experiment of the Holyoke National Bank will be watched with great interest to see what definite results are forthcoming in the way of new houses in the bank's community.

### Estimating the Selling Price of a Suburban Residence

A NEW YORK architect was recently called upon to render a somewhat unusual service for a client for whom he had designed a large suburban residence which was constructed in 1913. The client stated that for the needs of his present family the house was too large and felt that now was an advisable time to sell and build a smaller house for himself. He was somewhat at a loss, however, to determine what selling price to put on the house, as he did not wish to place it in the hands of a real estate agent until he had set a definite sales price.

In considering the sale of the average building, whether an investment building or a small home, market conditions largely govern sales value; but in the case of a suburban residence the sale price is largely governed by a personal element represented by the buyer's opinion, and in to-day's market it is apparent that as a rule two large suburban houses containing approximately the same cubic footage and with apparently equal land value will vary over 20 per cent in selling price. This is undoubtedly due to individual demand and to general conditions of the community. It is evident, therefore, that the owner's decision rather than market value must largely govern the price.

The method used by the architect in determining a fair selling price for this house is interesting and may prove of value to others who must face the same problem from time to time, or who through sound business judgment may encourage the sale of houses built some years ago for clients. In this case the selling price was estimated as follows:

To the cost of the land was added the cost of

improvements. The complete cost of the house and out-buildings was then computed from the architect's files, and to this total was added one-half of the increase in replacement value of the house. It was felt that this addition represented a saving to the buyer in proportion to the cost of building a new house, and also provided for any depreciation in the building. To the total thus gained a reducible margin of 10 per cent was added, as in the average case of the sale of a house of this type the quoted selling price is not fixed, but is open to offer on the part of the buyer. The tabulation of this individual cost estimate is as follows:

Cost of land (thirty acres).....	\$12,000
Improvements, including roads, landscape, planting, etc. ....	14,000
Cost of house and out-buildings .....	90,000
One-half increase in replacement value (estimating 100 per cent increase in building cost)....	45,000
	\$161,000
10 per cent reducible margin .....	16,100
Selling price of house .....	\$177,100

The determination on a definite selling price places the broker in a much better position to make a sale than a general commission to get an offer, which is quite an ordinary proceeding on the part of an owner of this class of property. The estate in question was not mortgaged, and the owner stated his willingness to leave a mortgage of \$100,000 at 5 per cent if this proved an inducement to the purchaser. In this manner there was presented a clean-cut selling proposition fair to all parties to the transaction.

# , A Small House at Paducah, Kentucky

W. E. GORE, ARCHITECT AND OWNER

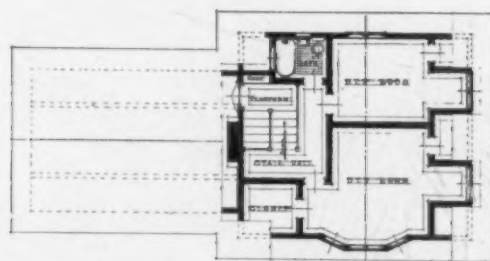


GENERAL VIEW OF MAIN FRONT

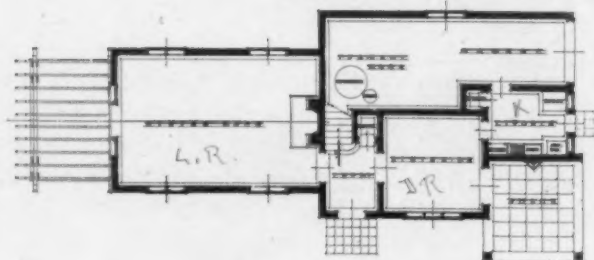


DETAIL OF ENTRANCE GABLE

*THIS English type country house is unique in combining in one building, without a cellar, a two-story living room, a garage and a furnace room in addition to the usual rooms. The kitchen forms a link between the living quarters and the garage and furnace room, this latter space being at grade level. The rooms are well arranged for ventilation, the living room being especially well equipped to make warm weather endurable. The bedrooms, likewise, have good cross ventilation, and the stairway, opening as it does from the upper part of the living room, provides passage of air through the length of the house.*



SECOND FLOOR PLAN



FIRST FLOOR PLAN



## An Influence for Better Small House Design

A COMMERCIAL ENTERPRISE IN WHICH THE VALUE OF ARCHITECTURAL DESIGN  
IS GIVEN FULL RECOGNITION

By FREDERICK L. ACKERMAN

**D**URING the last ten or fifteen years the subject of small house design has been a live topic of discussion among architects and at the Conventions of the Institute. Particularly has it been a live topic among members of the chapters of the Middle West. We have had our committees on Public Information attempting to spread propaganda relating to the better design of small houses, and some of the local chapters have gone to a great deal of expense and labor to encourage the building of better homes for the people. Competitions have been held and organizations effected for the distribution of plans to those interested in building small houses. This effort has not alone been confined to the profession. State agricultural colleges, State Departments of Agriculture and the Federal Department of Agriculture have likewise devoted a considerable amount of effort, not only to the stimulation of a better understanding of what constitutes the adequate, well designed, small house, but those several agencies have prepared plans for distribution to those living in our rural areas who wish to take advantage of the study given to this problem by the agencies above referred to. Nor is this attitude on the part of the profession and on the part of certain agencies of Government confined to the United States. Far more serious consideration has been given to this problem in Europe, and as result of years of experience with the problem the British Government

has recently issued a volume of considerable scope and detail, the purpose of which is to furnish information as to how best to build a small house.

If one may judge by the amount of space devoted to this subject in the British press, it is safe to say that the problem of providing the average man with an adequate house in an adequate environment is deemed to be a matter of no less than prime importance to the national welfare.

If we take into account all of these activities directed toward the provision of more adequate and better designed houses, it should be evident that there is a recognized difficulty in their production. That is to say, by these activities we acknowledge flatly that our system of production as it has been running, and our professional activities as they have been carried on individually and collectively, have failed in this rather important respect; neither our system of production nor our professional activity has thus far been able to provide the common man with a well designed house. Precisely why these two agencies have failed, of course, would be an interesting point to discuss; but a discussion of this point is not the purpose of this article, which is rather that of setting forth what has been attempted by utilizing the present business and professional mechanism as it exists.

Any architect who has ever attempted to select from the average catalogue of stock wood products, items which he might utilize and thereby save the



The English Cottage Type



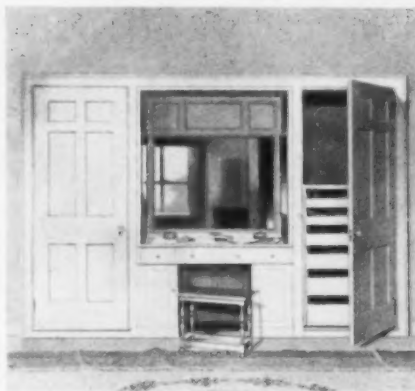
The "Southern" Bungalow Type

Typical Standard House Designs That Use Standard Wood Finish



expense of special forms, mouldings, etc., is so well aware of the utter lack of merit, from the standpoint of design in the materials shown in the average stock list and catalogue of woodwork, that no argument is needed to convince him of the desirability of having a stock list of simple elements of such a quality of design that he could actually use them in his practice. It was really out of their own recognition of the shortcomings of these various old stock lists of mouldings, sash, doors and trim previously furnished, that The Curtis Companies undertook the work of reorganizing all of their stock forms and lists.

But the reorganization of this stock list was no simple task. The architect into whose hand it was entrusted, recognized at the outset that there is no such thing as a standard of taste, and that every phase of the problem would have to be dealt with from the standpoint of averages; that is to say, it would be impossible to stock a line of materials which would meet the demands arising out of the idiosyncrasies of taste of the individuals constituting the entire profession, as well as a lack of taste on the part of many buyers. It was for



Standard Built-in Dressing Table

this reason that a study was made of those forms which had been most frequently used by architects of recognized standing and ability. Whatever could be adopted from architecture of an earlier period or from the work of contemporaneous architects, has been made use of without hesitation. And acknowledgment is made to those of the profession who generously responded to the request for suggestions and details

which experience had tested. In the design of all these elements the attempt has been made to supply what appeared to be a felt want. Certain concessions naturally had to be made to meet the requirements of quantity production under the machine process, but it was interesting to discover that so long as the selection was confined largely to simple forms, in this respect no serious difficulty was encountered.

Having developed in the rough the new designs for the stock list, the problem naturally arose as to where these forms could be used, for it became apparent that the earlier designs of houses, upon which the old details had been used, were not of such a character as to readily admit of the use of

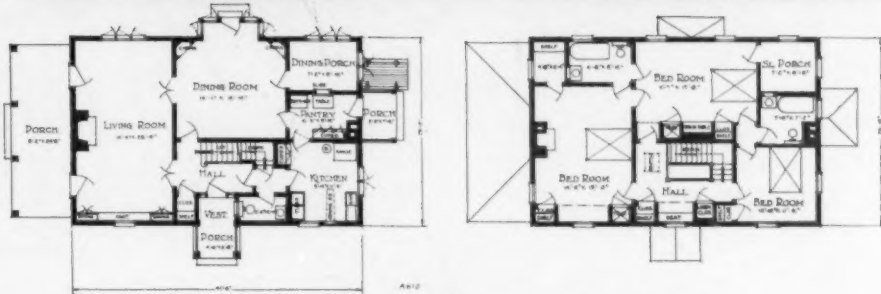


Standard Designs for Colonial Entrances To Be Carried in Stock  
Trowbridge & Ackerman, Architects

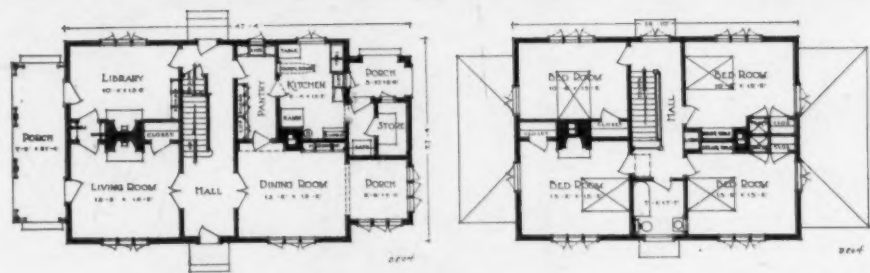
the new forms, and hence it was necessary to develop a complete list of new house designs to take the place of the old.

These new houses range from three to eight rooms as regards size. They are more or less equally divided as regards those appropriately designed for use upon wide and narrow lots. Generally speaking, what is spoken of as a "standard plan" is used as a basis for one or more Colonial expressions, one or more based upon British tradition, one or more of a so-called "Western" character, and among these houses of bungalow type there is always one design characterized as Southern.

In designing the house, the same underlying thought which was kept in mind in developing the de-



A Standardized Colonial House for Standard Wood Finish  
(Note Incorporation of Dressing Table Shown on Opposite Page)



A Standardized English Type House for Standard Wood Finish  
Trowbridge & Ackerman, Architects

tails was carried out; material and inspiration were drawn from every available source, and there was likewise an attempt to meet an average "common sense" standard of taste rather than to furnish designs which would meet the demands of those who desire something odd or peculiar. The accompanying illustrations, together with their titles, will serve to explain in more detail what has already been suggested in outline.

A study was made of what the various agricultural colleges and the State and Federal Departments of Agriculture had been doing in connection with the planning of farmhouses. The designs which were developed for this type of structure represent the consensus of opinion of those

who are supposed to know what constitutes an adequate farmhouse.

In the development of some two hundred houses one would naturally assume that a great variety of forms and details would be needed. In practice the opposite to this was discovered to be true. As a matter of fact, the new stock list extends the range of commodities to be obtained far beyond our actual needs, both as regards size and variety. This list was extended to meet a demand which had undoubtedly grown out of a long period of competitive effort. As a result of this experience I am convinced that a very small list of well designed stock forms would serve the architectural needs in the building of small houses in the United States, and a small list would save an endless amount of waste and confusion.

In this statement I am not dealing here with the question of whether or not "standardization" is fatal to the development of the creative impulse of individuals. I am rather merely taking for granted that quantity production by the machine process is an institution with which we must deal for the time being, and that our problem in effecting a more adequate material environment under



Typical Interior Staircase

the régime of the machine process is that of bringing the machine under control of the man. We may argue against the machine process as something which contaminates the effort of the workmen; and undoubtedly it is true that the machine process affects and tends to inhibit the creative impulse; but I incline to the idea that the time is not yet ripe for us to debate this phase of the question seriously.

For I believe thoroughly that, if the machine process could be lifted out of the control of predatory forces, or if we could bring our social and economic institutions and industrial processes into an harmonious working, we could create out of the machine process a material environment which would be superior, from the social standpoint, to anything thus far created by the architects and builders of the past. It might be that an art thus evolved would be rather more rigid. It might be that it would not conform to our criterions of taste which have grown out of our handicraft industry. If it did not then satisfy us, we could debate the question of what to do with the machine. For the present the problem appears to be that of discovering how to make man the master of the machine.



Standard Designs for Stock China Closets in English and Colonial Styles  
Trowbridge & Ackerman, Architects



# DEPARTMENT OF ENGINEERING & CONSTRUCTION

CHARLES A. WHITTEMORE, *Associate Editor*

## The Automobile and the Private Estate

### PART II. DIMENSIONS OF AUTOMOBILES

By TYLER STEWART ROGERS

A STUDY of the characteristics of automobiles shows that they have certain physical requirements which have a distinct effect on the design of estate units. A theoretical study of these characteristics is of little value without the facts showing the consequent requirements in detail. There has been surprisingly little written about the automobile from the point of view of its physical dimensions and its turning radius, hence inquiry into this field led to the preparation of a questionnaire designed to procure data covering all the dimensions of motor vehicles which affect the design of roads, driveways, parking spaces and garages. A diagram similar to Fig. 1 was sent to a list of automobile engineers representing approximately 172 manufacturers. At the time of this writing, answers have been received from about 46 manufacturers, giving data about 42 models of passenger cars and 37 trucks. Although incompletely covering the field of motor vehicles, the cars represented are sufficiently varied in their size and characteristics to indicate quite clearly the tendencies in motor car design. Certain figures do not seem to be correct in relation to the other dimensions obtained, hence in the accompanying tabulation showing the results of this investigation in detail there may be errors. This data, however, so far as known, is the first compilation of its kind, and therefore may prove of some value as a general guide to architects, landscape architects and engineers engaged in estate design.

Both passenger cars and trucks have been studied, inasmuch as they each have an effect on the dimensions of estate units. It would be folly to design an entrance gateway beautifully ornamented with iron work through which a van carrying the furniture to the new estate could not pass. It would be equally bad to design a graceful bridge strong enough for passenger cars but not able to stand the passage of a tank

truck bringing fuel oil to the residence. Similarly, the location of overhead wires and the height of overhead bridges should be governed by the dimensions of the largest size motor vehicle that might even occasionally wish to enter the property.

The study of the dimensions of passenger cars has its primary value in determining the design of turn-arounds, parking spaces, etc., Fig. 2.

A study of the extreme turning radius of passenger automobiles is given in Table 2. By extreme turning radius is meant the radius of the circle de-

**DIMENSIONS OF AUTOMOBILES**  
AFFECTING THE DESIGN OF ROADS, DRIVEWAYS, PARKING SPACES AND GARAGES.

DESCRIPTION	PASSENGER CARS		TRUCKS	
	SMALL MODEL	LARGE MODEL	LIGHT	HEAVY
A MINIMUM RADIUS-REAR INSIDE				
B MIN. RADIUS FRONT OUTSIDE				
C MIN. RADIUS-EXTREME OUTSIDE				
D MAXIMUM ANGLE - OUTSIDE				
E WHEELBASE				
F GAUGE				
G EXTREME OVERALL WIDTH				
H EXTREME OVERALL HEIGHT				
I EXTREME OVERALL LENGTH				
WEIGHT-FULLY EQUIPPED				

KINDLY SUPPLY ABOVE DATA FOR YOUR LARGEST AND SMALLEST MODELS OF PASSENGER CARS AND TRUCKS. MAKE NOTE ON REVERSE OF SPECIAL MODELS OF UNUSUAL DIMENSIONS OR TURNING RADIUS.

NAME OF MANUFACTURER \_\_\_\_\_ NAME OF CAR \_\_\_\_\_

Fig. 1. Questionnaire Used to Obtain Data

scribed by the most forward projection of the car, such as the front fender or bumper, when the car is turning the sharpest possible circle. Where no figure is given for the extreme radius, the radius of the front outside wheel is used. This diagram indicates that the variation is from 15 ft. to nearly 30 ft. Only four cars, however, have a radius under 19 ft. 6 in., and only four cars exceed 25 ft., hence the space requirements for turning most cars varies so slightly as to make it well worth while to accommodate the largest vehicle when making provision for any turn-arounds. It will thus be seen that a 60-ft. circle should be the smallest area provided for the turning of passenger cars without backing. It has been shown, however, that this minimum turning radius can only be approached in actual driving under very favorable conditions, hence the common practice of an 80-ft. or an 85-ft. turning space is none too small.

The gauge of passenger automobiles is shown to be uniformly 4 ft. 8 in., with the exception of one discontinued model having a tread of 4 ft. 9 in. and one having a tread of 4 ft. 8½ in.

The length of passenger cars is shown in Table 3. Dimensions vary from slightly over 11 ft. to 18 ft. 4 in. The questionnaire called for the extreme dimension, including bumpers, tenders, tire racks and other projections beyond the normal body lengths. Not all cars are equipped with these appliances, and therefore the figures in many instances only cover the extremes from the front springs to the rear fenders or top.

The width of automobiles is remarkably uniform, varying from 5 ft. 4 in. to 6 ft. 4 in. The latter dimension was reported by only one manufacturer and probably is for an export model or else is an error. Forty out of forty-one cars show a variation in extreme width of between 5 ft. 4 in. and

5 ft. 10 in. as shown in Table 4.

These last two dimensions, length and width, govern the design of parking spaces for automobiles whether outdoors or within garages. The uniformity of width simplifies the problem very much; and while the length of automobiles varies considerably, the extremes are not so great as to add material difficulties.

Table 5 is an analysis of the extreme height of automobiles. The variation in this case is from 5 ft. 2½ in. to 7 ft. 8¾ in.

The weight of passenger vehicles has little effect on the design of any unit of an estate, with the possible exception of the strength of floors for garages. Table 6 indicates that the extremes run between 1,540 and 5,103 pounds, with a comparatively uniform distribution between these weights.

A feature mentioned in Part I of this discussion, namely, the in-

### DIMENSIONS OF AUTOMOBILES

PASSENGER CARS						TRUCKS					
TABLE 2	TABLE 3	TABLE 4	TABLE 5	TABLE 6	TABLE 7	TABLE 8	TABLE 9	TABLE 10	TABLE 11	TABLE 12	
No.	Length	No.	Width	No.	Height	No.	Gauge	No.	Length	No.	Weight
2 15' 0"	15 11' 2½"	5 5' 4"	6 5' 2½"	15 15' 40"	17 18' 0"	3 4' 8"	13 12' 9"	5 5' 4"	3 6' 8"	13 1480	
17 15' 6"	16 "	8 "	22 5' 9"	16 19' 00"	1 19' 3"	5 "	36 14' 3"	11 5' 5"	5 7' 3"	5 2900	
26 15' 10½"	25 11' 6"	17 5' 5"	23 5' 11"	8 21' 60"	21 21' 0"	6 "	1 15' 0"	31 5' 6"	6 7' 5½"	36 "	
23 19' 0"	8 11' 10"	1 5' 6"	8 6' 2½"	17 22' 40"	6 22' 11"	11 "	17 15' 3"	36 5' 6½"	17 7' 8"	28 3220	
20 19' 6"	17 12' 1"	9 "	13 6' 4"	5 23' 65"	3 23' 0"	13 "	5 15' 4"	6 5' 7"	21 "	6 3420	
33 19' 6"	37 12' 4"	10 "	14 6' 5"	26 24' 00"	36 "	14 "	3 15' 10"	21 "	22 "	17 3700	
12 19' 11"	39 12' 11"	14 "	31 "	1 25' 80"	22 23' 3"	17 "	28 "	22 "	24 7' 10"	31 4150	
15 19' 11½"	40 13' 0"	25 "	9 6' 6"	39 26' 50"	28 24' 8"	24 "	21 15' 11"	28 "	28 "	29 4400	
16 "	1 13' 4"	27 5' 6½"	17 "	14 27' 30"	11 25' 0"	28 "	6 16' 8"	13 5' 7½"	18 8' 0"	11 4500	
5 20' 0"	11 "	3 5' 7"	32 "	37 28' 50"	14 "	31 "	11 "	17 5' 7½"	19 "	3 4800	
14 20' 4"	26 "	4 "	3 6' 7"	12 28' 64"	2 26' 0"	34 "	14 17' 1"	3 5' 8"	4 8' 1"	32 "	
3 20' 5"	12 13' 11"	12 "	4 6' 8"	4 29' 40"	32 27' 0"	36 "	22 "	32 "	11 "	34 4650	
11 20' 6"	14 14' 0"	18 "	5 "	9 29' 47"	7 28' 6"	21 4' 8½"	16 17' 1½"	14 5' 8½"	14 8' 1½"	9 5035	
27 "	20 "	38 "	20 "	25 29' 50"	16 29' 0"	22 "	32 17' 8"	1 5' 9½"	9 8' 2"	21 6300	
31 20' 9"	5 "	39 "	28 "	40 29' 80"	18 "	1 4' 10"	31 17' 9½"	16 5' 9½"	31 8' 4"	10 6750	
8 20' 10"	31 14' 1"	40 "	38 "	2 30' 00"	4 29' 10"	19 "	24 18' 0"	7 5' 10½"	32 "	14 7400	
6 21' 0"	38 "	15 5' 7½"	39 "	38 "	9 30' 0"	29 "	7 18' 2"	24 5' 11"	25 8' 5½"	37 7925	
4 21' 5"	2 14' 2"	16 "	24 6' 8½"	27 31' 00"	10 "	32 "	9 18' 8½"	34 "	20 8' 6½"	19 8000	
19 21' 8"	19 "	31 "	15 6' 9"	31 31' 40"	34 30' 3½"	9 4' 10½"	19 20' 2"	19 6' 0"	12 8' 7½"	18 8200	
9 21' 10½"	9 14' 3"	33 "	16 "	20 32' 40"	37 30' 6"	25 5' 0"	8 20' 5"	4 6' 1½"	26 "	24 8600	
12 21' 11"	4 14' 4"	6 5' 8"	26 "	24 34' 30"	8 31' 0"	4 5' 0½"	26 20' 8"	37 6' 2½"	27 "	7 9000	
18 22' 3"	24 14' 6"	7 "	41 "	19 35' 00"	31 31' 11"	7 5' 1½"	18 20' 6½"	9 6' 4"	10 8' 8"	22 9360	
29 22' 6"	18 14' 8"	11 "	19 6' 10"	22 36' 00"	35 32' 3½"	18 5' 4½"	25 21' 0"	18 6' 7½"	33 "	35 9400	
10 22' 9"	27 "	19 "	25 "	10 36' 90"	33 34' 0"	2 5' 5"	4 21' 8"	26 6' 10"	1 9' 8"	12 9900	
24 "	22 14' 10"	24 "	27 "	32 "	12 35' 0"	8 "	37 21' 8½"	27 "	2 "	33 11000	
32 23' 0"	32 15' 1½"	32 "	37 "	6 38' 65"	23 36' 0"	37 "	15 21' 9"	2 7' 0"	23 12' 0"	1 "	
34 "	6 15' 3"	41 "	40 "	28 39' 00"	24 38' 0"	10 5' 6"	20 21' 11½"	8 7' 2½"		30 11600	
41 "	28 15' 4"	42 "	7 6' 11½"	11 40' 00"	25 42' 0"	33 5' 6½"	10 22' 10½"	15 "		26 12500	
38 23' 1"	41 15' 3½"	29 5' 8½"	10 7' 0"	13 "	27 56' 0"	30 5' 9½"	2 23' 0"	25 "		25 15000	
30 23' 6"	29 15' 9"	30 "	18 "	23 41' 20"		12 5' 10½"	12 23' 4"	10 7' 3½"		15 16150	
13 24' 0"	7 15' 10"	22 5' 8½"	21 "	18 41' 50"		20 6' 0"	33 25' 4"	23 7' 4½"		4 16300	
22 "	10 15' 11½"	23 "	33 7' 0½"	33 42' 25"		33 6' 1½"	23 26' 4½"	20 7' 3½"		2 18000	
1 24' 5"	3 16' 0"	20 5' 8½"	30 7' 0½"	41 43' 00"			27 26' 8"	12 7' 6½"		8 20390	
42 24' 6"	33 16' 2"	2 5' 9"	11 7' 1"	34 43' 70"				33 7' 8"			
40 24' 10"	42 16' 2½"	26 "	2 7' 2"	7 44' 25"							
7 25' 0"	30 16' 5"	35 "	42 "	42 47' 00"							
39 25' 8½"	13 16' 8"	28 5' 9½"	12 7' 4"	35 51' 03"							
35 26' 6"	35 17' 6"	13 5' 10"	35 7' 8"	21 56' 00"							
21 28' 0"	36 18' 0"	21 6' 0"	36 "								
36 29' 6"	21 18' 4"	37 6' 4"	1 7' 8½"								

ANALYSIS OF RETURNS ON QUESTIONNAIRE  
SEE TABLE 1 FOR NAMES OF AUTOMOBILES

MARCH 1920

T. S. ROGERS

Fig. 2. Tables of Dimensions in Classified Sequence



## TRUCKS

No	NAME Reference Fig	Radial			Angle D	Wheel- base L	Gauge F	Length I	Width G	Height H	Weight	Remarks
		A	B	C-A								
1	Autocar	19'3"		C		8'1"	4'10"	15'0"	5'3"	9'8"	11,000*	*with load+body
2	"	26'0"				13'0"	5'5"	23'0	7'0"		18,000*	"
3	Bethlehem 3/4 T	13'4"	22'7"	9'3"	23'0"	30"	10'5"	4'8"	15'10"	5'8"	6'8"	4,800
4	" 3 1/2 T	23'8"	28'9"	5'1"	29'2"	28"	13'6"	5'0"	21'8"	6'1 1/2"	8'1"	16,300
5	Briscoe					32"	10'1"	4'8"	15'4"	5'4"	7'3"	2,900
6	Chevrolet	22'0"			22'11"	33"	10'5"	"	16'8"	5'7"	7'5 1/2"	3,420
7	Denby 2 T	24'6"	28'6"	4'0"		35"	12'0"	5' 1 1/2"	19'2"	5'10 1/2"		9,000
8	" 5 T	26'4"	31'0"	4'8"		30"	14'2"	5'5"	20'5"	7'2 1/2"		20,390
9	Dorris 2 T				30'0"		12'0"	4' 10 1/2"	18'3 1/2"	6'4"	8'2"	5,065
10	" 3 1/2 T*				30'0"		16'2"	5'6"	22'10 1/2"	7'3 1/2"	8'8"	6'750
11	Federal				25'0"		11'0"	4'8"	16'8"	5'5"	8'1"	4,500
12	"				35'0"		15'0"	5'10"	23'4"	7'6 1/2"	6' 1 1/2"	9,900
13	Ford				23'3"	32'15"	10'3"	4'8"	12'9"	5'7 1/2"		1,480
14	Garford 2 1/4 T	15'6"	22'7"	7'1"	23'0"		11'3"	"	17'1"	5'8 1/2"	8' 1 1/2"	7,400
15	" 3 1/2 T						17'9"	7'2 1/2"				gross weight
16	Gramm-Bernstein				29'0"		13'6"		17' 1 1/2"	5'9"		"
17	International	13'6"	17'0"	3'6"	18'0"	27"	9'7"	4'8"	15'3"	5'7 1/2"	7'8"	3,700
18	"	18'0"	28'0"	10'0"	29'0"	30"	15'5"	5'4 1/2"	20'0"	6'7 1/2"	8'0"	8,200
19	Jackson				30"		12'6"	4'10"	20'2"	6'0"		8,000
20	Monroe						13'4"	6'0"	21' 1 1/2"	7'3"	8'6"	
21	Nash 2018	21'0"			21'30		10'10"	4'8"	15'11"	5'7"	7'8"	6,300
22	" 3018	23'3"			"	12'0"	"	17'1"	"	"	"	9,360
23	Packard 5 T (62)				36'0"		15'6"	"	26' 1/2"	7'4 1/2"	12'0"	
24	Paige-Detroit	36'0"			30"		11'8"	4'6"	19'0"	5'11"	17'10"	8,600
25	"	42'0"					13'4"	5'0"	21'0"	7' 1 1/2"	8' 5 1/2"	15,000
26	Pierce-Arrow 5 T						"	"	20'8"	6'10"	8' 7 1/2"	12,500
27	" 5 T*	56'0"					17'0"		26'8"	"	"	*extra long chassis
28	Reo	16'5"	23'8"	7'3"	24'8"	35"	10'8"	4'8"	15'10"	5'7"	7'10"	3,220
29	Selden 1 1/2 T						11'8"	4'10"				4,400
30	" 5 T*						16'0"	5'3"				11,600
31	Traffic Model C	24'10"	31'6"	6'8"	31'11"	20'30"	11'0"	4'8"	17'9"	5'6"	6'4"	4,150
32	U.S. 1 1/2 T		25'0"		27'0"	23"	12'0"	4'10"	17'8"	5'6"	"	4,800
33	" 6 T		31'0"		34'0"		14'4"	6' 1 1/2"	23'4"	7'6"	8'8"	11,000
34	Vellie 1 1/2 T		30' 3 1/2"				11'1"	4'8"		5'11"		4,890
35	" 3 T		32' 3 1/2"				14'5 1/2"	5'6 1/2"				9,400
36	White 3/4 T		23'0"			33"	11' 1 1/2"	4'8"	14'3"	5'6 1/2"		2,900
37	" 5 T		30'6"			31"	14'6"	5'5"	21'0 1/2"	6'2 1/2"		7,925

## DIMENSIONS OF AUTOMOBILES

COMPLETE TABULATION OF RETURNS ON QUESTIONNAIRE  
SENT TO AUTOMOTIVE ENGINEERS - MARCH 1920

T. J. ROGERS

## PASSENGER CARS

No.	NAME	Radius			Wheel- base	Gauge	Length	Width	Height	Weight	Remarks	
		A	B	C-A C	D	E	F	G	H			
1	Reference Fig 1 Allen 45	16' 10 1/2"	23' 5"	6' 4 1/2"	24' 5"	23' 50"	9' 1 1/2"	4' 8"	13' 4"	5' 6"	7' 8 1/2"	2580
2	Anderson	13' 6"	15' 0"	5' 0"	10' 0"	10' 0"	"	"	14' 2"	5' 9"	7' 2"	3000
3	Apperson 8-20	11' 0"	19' 6"	8' 6"	20' 5"	4' 5"	10' 10"	"	16' 0"	5' 7"	6' 7"	
4	Auburn	14' 8"	20' 6"	5' 10"	21' 5"	3' 6"	10' 0"	"	14' 4"	5' 7"	6' 8"	2940
5	Briscoe	20' 0"	10' 1"	9' 1"	36'	9' 1"	"	"	14' 0"	5' 4"	"	2365
6	Cadillac-Roadster	11' 6"	10' 5"	10' 5"	21' 0"	10' 5"	"	"	15' 3"	5' 8"	5' 2 1/2"	3865
7	" Limousine	16' 0"	11' 0"	11' 0"	25' 0"	11' 0"	"	"	15' 10"	"	6' 1 1/2"	4425
8	Chevrolet 490 Sedan	20' 0"	20' 10"	30' 33"	8' 6"	11' 10"	"	"	11' 10"	5' 4"	6' 2 1/2"	2160
9	" FB Sedan	21' 0"	21' 10 1/2"	32' 1"	11' 0"	5' 4"	"	"	15' 3"	5' 6"	6' 6"	2947
10	Cole Aero-Light 870	19' 0"	22' 3"	3' 5"	22' 9"	3' 1"	10' 7"	"	15' 1 1/2"	5' 6"	7' 1"	4000
11	Detroit Electric	12' 4"	19' 0"	6' 8"	20' 6"	2' 6"	8' 4"	"	13' 1 1/2"	5' 6"	7' 4"	2894
12	Dodge Brothers	9' 7 1/2"	11' 5"	11' 5"	12' 11"	10' 11"	9' 6"	"	13' 11"	5' 7"	7' 4"	4000
13	Dorris	24' 0"	11' 0"	11' 0"	24' 0"	11' 0"	"	"	16' 8"	5' 10"	6' 4"	4000
14	Elgin Six	12' 4"	19' 4"	7' 0"	20' 4"	3' 2"	9' 10"	"	14' 0"	5' 6"	6' 5"	2750
15	Ford Torpedo	12' 6 1/2"	19' 3 1/2"	6' 9 1/2"	19' 11 1/2"	32' 15"	8' 3"	"	11' 2 1/2"	5' 7 1/2"	6' 9"	1540
16	Ford Sedan	"	"	"	"	"	"	"	"	"	"	1900
17	Harroun AA-2	6' 4"	14' 6"	8' 2"	15' 6"	4' 0"	8' 10"	"	12' 1"	5' 3"	6' 6"	2240
18	Hudson Super-34	15' 3"	22' 3"	7' 0"	28' 30"	10' 6"	14' 8"	"	14' 8"	6' 7"	7' 0"	4150*
19	Jackson	21' 0"	10' 1"	10' 1"	21' 8"	10' 1"	"	"	14' 2"	5' 8"	6' 10"	3500
20	Jones	15' 0"	19' 0"	4' 0"	19' 6"	3' 0"	10' 6"	"	14' 0"	5' 8 1/2"	6' 8"	3240
21	Locomobile	17' 8"	27' 0"	9' 4"	28' 0"	2' 3"	11' 10"	4' 8 1/2"	18' 4"	6' 0"	7' 0"	3600
22	Marmion 34	16' 0"	23' 0"	7' 0"	24' 0"	3' 8"	11' 4"	4' 8"	14' 10"	5' 8 1/2"	5' 9"	3600
23	"	"	"	"	"	"	"	"	15' 10"	"	5' 11"	4120
24	Mitchell F-5-40	15' 3"	21' 10"	6' 5"	22' 9"	3' 0"	10' 0"	"	14' 6"	5' 8"	6' 8 1/2"	3430
25	Milburn Electric	19' 0"	10' 5"	10' 5"	35' 8' 9"	10' 5"	"	"	11' 6"	5' 6"	6' 10"	2950
26	Monroe	12' 5"	15' 6"	3' 1"	15' 10 1/2"	9' 7"	"	"	13' 4"	5' 9"	6' 9"	2400
27	Nash 682	20' 6"	10' 7"	10' 7"	24' 0"	3' 8"	11' 4"	4' 8"	14' 8"	5' 6 1/2"	6' 10"	3100
28	National Sixlet	22' 6"	10' 8"	10' 8"	15' 9"	5' 8 1/2"	6' 8"	"	15' 4"	5' 9 1/2"	6' 8"	3900
29	Packard 3-25	23' 6"	11' 4"	11' 4"	16' 5"	"	7' 0 1/2"	"	15' 9"	5' 8 1/2"	"	
30	" 3-35	23' 6"	11' 4"	11' 4"	16' 5"	"	7' 0 1/2"	"	16' 5"	"	7' 0 1/2"	
31	Paige-Detroit	20' 9"	9' 11"	9' 11"	14' 1"	5' 7 1/2"	6' 5"	"	14' 1"	5' 7 1/2"	6' 5"	3140
32	"	23' 0"	10' 7"	10' 7"	15' 1 1/2"	5' 8"	6' 6"	"	15' 1 1/2"	5' 8"	6' 6"	3690
33	Pierless	19' 6"	10' 5"	10' 5"	19' 6"	10' 5"	"	"	16' 2"	5' 7 1/2"	7' 0 1/2"	4225
34	Pierce Arrow 38	21' 6"	11' 2"	11' 2"	23' 0"	11' 2"	"	"	16' 2"	5' 7 1/2"	7' 0 1/2"	4370
35	" 48	25' 0"	11' 10"	11' 10"	26' 6"	11' 10"	"	"	17' 6"	5' 9"	7' 8"	5103
36	" 66*	29' 6"	12' 3 1/2"	4' 9"	18' 0"	12' 3 1/2"	4' 9"	"	18' 0"	"	"	"
37	Pilot	15' 6"	22' 2"	6' 8"	23' 1"	3' 0"	10' 0"	12' 4"	6' 4"	6' 10"	2830	
38	Reo U6	16' 0"	23' 0 1/2"	7' 0 1/2"	25' 0 1/2"	2' 6"	9' 3 1/2"	2' 6"	14' 1"	5' 7"	6' 8"	3000
39	Vellie 34	15' 0"	22' 10"	7' 10"	24' 10"	2' 7"	9' 6 1/2"	"	12' 11"	"	"	2650
40	Vellie 48	15' 0"	22' 10"	7' 10"	24' 10"	2' 7"	9' 6 1/2"	"	13' 0"	"	6' 10"	2980
41	Winton	15' 0"	22' 0"	7' 0"	23' 0"	3' 6"	11' 0"	15' 3 1/2"	5' 8"	6' 9"	4300	
42	"	"	25' 6"	6' 6"	24' 6"	3' 6"	11' 6"	16' 2 1/2"	"	7' 2"	4700	



crease in the gauge of automobiles while turning sharp corners, is shown on page 173 under the column headed "Differences." In this column figures are arrived at by subtracting the data given for Dimension A in Fig. 1 from the figures given for Dimension C. The fact that several of these differences are less than the normal gauge of the cars indicates that the manufacturers did not interpret the questionnaire properly.

The results of the questionnaire as reported by motor truck engineers were less complete in some respects than those covering passenger cars. Truck engineers were fully prepared with the dimensions of their vehicles relating to body design, but had apparently given little consideration to their turning ability.

Analysis of the turning radii of 29 trucks is shown in Table 7. The extremes vary from 18 ft. to 56 ft., showing that much larger space is required for the handling of motor trucks than is necessary for passenger cars. On private estates it is customary to allow smaller space for service areas used by trucks than for the forecourts and other turn-arounds designed for passenger vehicles. A truck can be turned in from  $1\frac{1}{2}$  to 2 times its length, hence an area 40 ft. to 60 ft. square should be ample for an enclosed service court which will be used only by ordinary trucks. It is interesting to note that the first group of cars shown in the table, whose turning radii range from 18 ft. to 24 ft., represent the types of delivery trucks most commonly used by merchants.

The gauge of motor trucks varies considerably from the standard of 4 ft. 8 in. commonly adhered to by passenger vehicles. Table 8 shows that nearly half of the trucks reporting have standard gauge, while the others range from 4 ft. 10 in. to 6 ft.  $1\frac{1}{2}$  in.

The length of trucks shows considerable variation. The smallest truck given in the tabulation is only 12 ft. 9 in. long and the largest truck, which has an extra long chassis, is 26 ft. 8 in. in over-all length. Between these two dimensions the other cars are fairly well distributed. Trucks of extra long wheelbase, designed for carrying special loads like lumber, seldom have occasion to enter an estate, and are therefore not to be seriously considered in estate design. Table 9 gives an analysis of the length of trucks.

The width of commercial vehicles varies from 5 ft. 4 in. to 7 ft. 8 in. as shown in Table 10. Bodies for special purposes are seldom made by truck manufacturers, but are built to order by body makers—hence these dimensions do not indicate the extremes which are reached. One furniture van which was measured by the writer was 7 ft. 10 in. wide.

Table 11 shows the height of trucks. They vary from 6 ft. 8 in. to 12 ft. The wide difference reported is accounted for by the fact that truck manufacturers only give the height of the drivers' cabs, and the bodies frequently extend much above this point. The 12-ft. dimension reported included a special enclosed body similar to those used by furniture movers.

The weight of the trucks reported varies from 1,480 to 20,390 pounds. In most instances these weights include the permissible load and body. Extremely low weights are evidently of the chassis only. The greatest weight indicated is not the limit of weight reached by motor vehicles, as certain manufacturers are producing standard  $7\frac{1}{2}$ -ton trucks and in special instances (such as for road making machines) they have produced 10-ton trucks.

This inquiry, when compared with one made in 1911 by Arthur C. Comey, shows interesting tendencies in truck design. Mr. Comey, in his article in *Landscape Architecture*, July, 1911 (Vol. 1, No. 4), reported the results of an investigation covering 44 manufacturers of trucks. At that date several manufacturers stated that "widths beyond 7 ft. render trucks difficult to handle in crowded streets and likely to be overloaded."

The width of 1-ton trucks varied from 5 ft. to 6 ft. 4 in. for standard machines. For 5-ton trucks the widths ranged from 6 ft. to 7 ft. 2 in. One 10-ton truck was reported having a standard width of 7 ft. 9 in. Special inquiry showed some remarkable extremes in the width of certain vehicles. Five manufacturers reported products exceeding 8 ft. in width, the extreme dimension being 9 ft. 6 in. Such great width is now prohibited in certain states and will probably not ever become common because of this fact.

In passenger-car design recent tendencies seem to indicate a reduction in height in nearly all classes of cars. In the more expensive cars some increase in length may be noted. Reduction in weight is a popular demand for the sake of economy. Handling ease, which means small turning radii, has very recently become a selling point both in cars and trucks, and it seems probable that more and more attention will be paid by designers to this feature.

Average dimensions have not been computed for the reason that averages are dangerous to use for design purposes. Extreme dimensions should be used in the design of accommodations for automobiles wherever possible. Where economy is of paramount importance the character of the vehicles to be provided for should be carefully considered and dimensions selected which will bar only the cars least likely to require accommodation.

# Heating and Ventilating

## PART III.

### ELECTRICAL HEATING AND FACTORS DETERMINING SELECTION OF SYSTEM

By C. W. KIMBALL

**E**LECTRICAL heating, like gas and kerosene, is (due to the cost of supply as compared to coal and wood) used mainly as an auxiliary for the quick heating of rooms, show windows and comparatively small enclosed spaces.

The safety with which electric units may be used, their positive lack of odor, and absolute control of heat makes electricity of extreme value where auxiliary heating is required.

As heating units we have several types, each filling a special requirement.

1. Grid or car heater type of varying sizes consuming from 1,000 to 10,000 watts per hour. These are mainly installed in fixed locations and controlled by means of large switches. They may be in the room to be heated or may be set in the basement and air drawn over them similar to indirect radiation.

2. The luminous type consisting of special type of frosted incandescent lamps set in a receptacle in front of a copper reflector. These serve the double purpose of heat and light to a certain extent.

3. The electric log consuming from 500 to 1,000 watts per hour, having a heating element partly concealed in an artificial log of refractory material and generally set in fireplaces.

4. The projecting reflectory type consuming from 500 to 1,000 watts, having an incandescent coil set in a parabolic polished reflector with suitable wire guard. This type projects the heat in one direction and has been found very efficient for this use.

5. The combined type consisting of a sectional radiator of the same general appearance as the radiators used with steam-heating systems. Such radiators are portable and of different sizes, consuming from 500 to 4,000 watts per hour, depending on the number of sections. These radiators are partly filled with liquid in which a heating unit is immersed. They are efficient and safe in all locations.

Electric heating due to cost of current in most sections of the country is limited mainly to the following uses and probably will not be in general use until such a time as electricity can be sold at about one-fourth its present cost:

1. For the heating of lodge or other rooms, or spaces which are but seldom used and for a few hours only at a time, where the question of labor

in maintaining a steam plant for such intermittent service is an important item.

2. Where electricity can be generated by means of water power, as on some private estates, and under conditions when the cost of producing such power is small, or when the question of cost can be disregarded.

3. Where heat is needed occasionally in addition to the regular system.

4. Where heat of absolutely uniform temperature is desired in industrial work.

5. In hospitals and homes where auxiliary heat is required for a short time or for heating water, pads or other devices.

#### Selection of a Heating System

Some of the main points to be considered in the selection of a heating system for any building are as follows:

1. Size and location of building.
2. Use of building.
3. Adaptability.
4. Owners' desires or preferences.
5. Operating costs.
6. First cost.

Small residences, churches, schools, halls and buildings of like nature unless heated from central plants are generally heated by furnaces after due consideration of the above points.

Larger buildings generally require the use of hot water or steam systems of one form or another. Here the preference of the owner and the first cost many times are the deciding factors with very little attention paid to the efficiency of the system selected. If the choice is not fixed by these points, it is well to remember that vapor systems or gravity hot water systems are well adapted to all residential work, all ordinary schools, halls, shops, etc.; while for the large projects, especially where the buildings are spread out, the vacuum or forced hot water heating systems are preferable. Garages, factories, storehouses and buildings of that class are especially adapted to the use of the combined heating and sprinkler system where the use of sprinklers is necessary.

**BOILERS.**—The boilers or heaters occupy the same place with reference to a building as the heart does to the human system, and unless care and judgment are used in the selection of the boiler, the heating results in every way will be

unsatisfactory. In determining the size and kind of furnaces or heaters to be used, the foregoing six points must be considered. After the kind and type of heater are determined, the size is the most important point, and too much cannot be said to emphasize the necessity of having heaters sufficiently large. Be sure, always, to get them too large rather than too small. Don't economize on the heart of the system and endanger the success of the whole.

In determining the size of the hot water or steam boiler or boilers to be used, do not rely on the ratings published in catalogues. For housework and other small systems, a safe way is to double the radiation and select a boiler rated at a little more than this result. Another way on larger work is to reduce the load to direct radiation equivalent by taking the direct cast-iron radiation at its face value. For pipe coils add 20 per cent; direct-indirect, add 33 $\frac{1}{3}$  per cent; gravity indirect, add 50 per cent; accelerating coils, add 50 per cent, and fan-coil surface multiply by 4, 5, 6, 7 or 8, dependent on the velocity and temperature of air passing through the coils—a fair average being 5 or 6. Add these various figures together and allow approximately 25 per cent for heating surface in the covered steam mains and in the risers, and then select a boiler or boilers one or two sizes larger than the resulting figure would indicate.

Be sure that the chimney is of ample capacity to care for all the heaters, and that it extends well above any other part of the building. Poor draft is sure to result in excessive coal consumption and will prevent a properly selected boiler doing its work efficiently.

**RADIATION.**—In determining the type of radiation to be used for heating surfaces, the available space is likely to be the greatest factor. In the better class buildings, many times it is necessary to use indirect radiation or to conceal the direct radiation in slots behind grilles.

To determine the necessary amount of radiating surface, there are many rules in use, all of which must be used with experience and judgment. One of the simplest possible approximate rules is the 2-20-200. This is applied by dividing the total exposed glass surface by 2, the exposed wall surface by 20, and the cubic contents of room by 200; these results added together will give the amount of radiation for south rooms. Add 15 per cent for the north rooms and 10 per cent for the east and west rooms.

Another and more carefully worked out calculation is the Chicago method, as follows:

Schedule for computing minimum quantities of steam radiation at 70 degrees F. with the outside

temperature at 10 degrees F. below the zero point:

1 foot of radiation for every 300 cubic feet of contents, plus

1 foot of radiation for every 15 square feet of net exposed wall, plus

1 foot of radiation for every 2 square feet of glass surface.

For all rooms with plastered ceilings and unheated air space between ceiling and roof, add 1 square foot of radiation to every 30 square feet of ceiling area.

For all rooms with ceiling plastered on roof joists, add 1 square foot of radiation to every 20 square feet of ceiling area.

For all rooms with ceiling of open joist or concrete roof construction, add 1 square foot of radiation to each 10 square feet of roof.

For all rooms with northeast or northwest exposures, add 10 per cent additional radiation.

Where radiators are placed under seats or behind grilles, add 20 per cent additional radiation, and when placed in open recesses, add 10 per cent additional radiation.

For indirect radiation, add 50 per cent additional.

For direct-indirect with fan system, add 25 per cent additional radiation.

In measuring glass surface the full opening in the wall should be figured. Outside door openings should be taken as glass.

For computing minimum quantities of hot water radiation, add 60 per cent to amount necessary for steam.

For computing minimum quantities for vapor systems, add 20 per cent to amount necessary for steam.

A vapor system is defined as a two-pipe steam system which has the return lines open to atmosphere, with no valve at the return connections of the heating units which will close against steam.

For heating to temperatures other than from minus 10 degrees to 70 degrees, multiply above quantities by the following coefficients:

— 10 to 65 .....	.94
— 10 to 60 .....	.87
— 10 to 55 .....	.81
— 10 to 50 .....	.75
— 10 to 45 .....	.69
— 10 to 40 .....	.62

The above schedules of quantities are commensurate with good heating results for the *average* building of *average* construction, but by no means to be construed as guarantees of the proper quantity of radiation necessary to heat every building, as extraordinary conditions will of course require additional radiation.

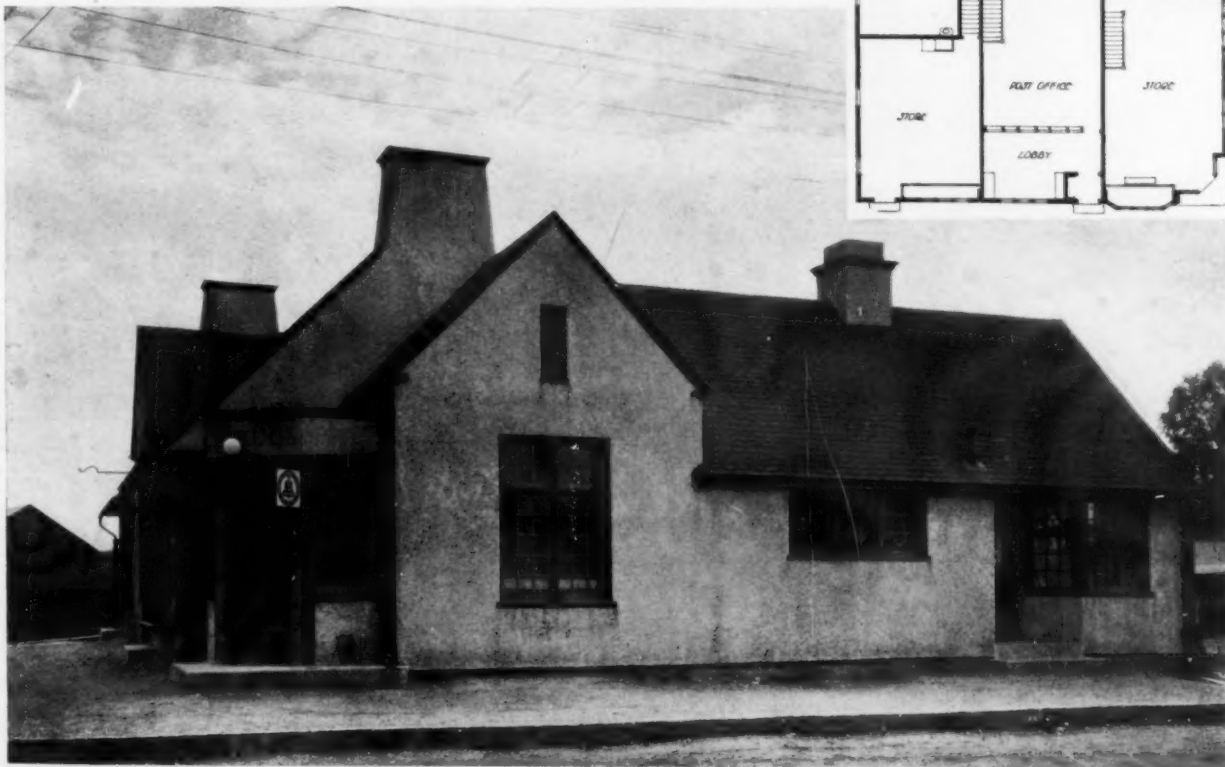
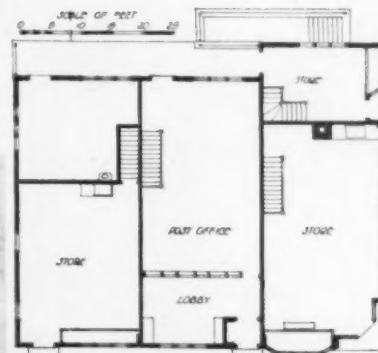


# A Small Suburban Store Building at Southboro, Mass.

CHARLES M. BAKER, ARCHITECT



*THE building illustrated herewith indicates the charm that simple store buildings may have when they receive some architectural consideration. An interesting fact in connection with the design of this building is that it was built on the exact foundations of an old building that had been destroyed by fire, and although exactly square in plan to suit the conditions, there is no suggestion of the cube in its exterior appearance.*



## EDITORIAL COMMENT

ANY promise of more stable conditions in the ranks of labor connected with the building industry to-day forms a bright spot on the architect's horizon. If building projects on which architects have spent much time and thought have successfully withstood the onslaught of high material prices, it is rare that they have not had to contend with the peculiar and insistent demands of labor before reaching completion. It is, therefore, with some degree of relief that the first findings of the recently formed National Board of Jurisdictional Awards are received, for there is now a definite promise of relief from the many irritating and senseless disputes arising between rival unions over the division of work that have in the past consumed valuable time and wasted large sums of money.

It will be recalled that at the last Convention of the American Institute of Architects the members of the Institute were bound to observe the awards of this national board, which has been organized through the patient efforts of the Institute working with the Building Trades Department of the American Federation of Labor, Engineering Council and the Associated General Contractors of America.

The findings of this board have particular interest for architects in that they govern the division of contract work as noted in specifications. In accordance with the agreement made by the Institute with the associated organizations, members of the Institute are required to observe the rulings in the preparation of their specifications, and other architects are morally bound to recognize them in order to lend their assistance to establishing the awards and also to avoid labor difficulties on work which is under their direction.

The following decisions were reached at the first meeting of the board held recently in Washington.

*Air Coolers.* Section I. All sheet metal work of No. 10 gauge, or lighter, used on air washers, fans, blowers, or the housing of same, shall be recognized as being the work of the Amalgamated Sheet Metal Workers International Alliance. Section II. All pipe fitting in connection with preceding is awarded the steam fitters, represented by the United Association of Journeymen Plumbers, Steam Fitters and Steam Fitters' Helpers.

*Corner Beads.* Plasterers, represented by the Operative Plasterers' and Cement Finishers' International Association, are awarded jurisdiction over metal corner beads, secured to the structure with a plastic material.

*Cutting Chases.* In the dispute between brick-

layers and electrical workers, jurisdiction of cutting of grooves, channels, chases in brickwork, etc., is given to the bricklayers where such chases exceed 2 x 2 ins. in size or require labor in excess of eight continuous hours. Work less than this is awarded the electricians.

*Electrical Work on Elevators.* Electrical work on flashlights, electrical annunciators, lamps and feed wires to the controller is awarded the electrical workers. All other work is awarded the elevator constructors.

*Low Pressure Heat.* Regarding the question of heat in buildings during construction, jurisdiction is given the steam fitters until the initial test is completed, immediately after which time, if heat is necessary, a stationary engineer shall be employed by owner or contractor.

*Metal Glazing.* All glass set in sheet-metal sash, frames, doors or skylights shall be set by members of the Brotherhood of Painters, Decorators and Paperhangers of America; all sheet-metal work on sheet-metal sash, frames, doors and skylights shall be done by members of the Amalgamated Sheet Metal Workers' International Alliance.

*Pipe Railing.* Pipe railing, consisting of standard sized cut and threaded pipe not used in connection with structural or ornamental iron work, is awarded to the United Association of Plumbers and Steamfitters.

*Reinforcing in Concrete.* All iron and steel work for reinforcement in reinforced concrete, cement and floor construction shall be done by members of the Iron Workers' International Association.

*Vitrolite and Other Opaque Glass.* The setting of this type of glass is awarded to the Bricklayers', Masons' and Plasterers' International Union.

### STANFORD WHITE MEMORIAL


THE memory of the late Stanford White is to be perpetuated through the erection of a pair of bronze doors which the friends of the distinguished architect will present to the New York University Library, designed by Mr. White.

The doors will be unique in that they will contain a number of medallions symbolizing Art, the original of which will be contributed free by a number of sculptors formerly associated with the architect. The design has been entrusted to Laurence Grant White, son of Stanford White.

It is the purpose of the committee in charge to appeal for funds solely from friends and admirers of the late architect. Funds destined for the memorial may be addressed to W. Francklyn Paris, 7 West 43d street, New York.



--or equal



is **NEVER** equal

SIX years ago, we told architects that they had "better break the pen" before writing "or equal" in their roofing specifications.

It was important then, but is even more important now, because Barrett Specification Roofs carry a Surety Bond Guarantee.

No "or equal" roof dares to give such a bond.

IN writing your roofing specifications it is important *not* to add the loophole phrase "or equal."

An "or equal" Specification puts the honest contractor at a disadvantage and leaves the way open for any less scrupulous bidder to "skin the job" by using inferior materials and construction.

If you will write into your roofing specification simply this — "The roof shall be laid according to The Barrett Specification dated May 1, 1916, and the roofing contractor shall secure for me the (20- or 10-Year) Surety Bond therein mentioned, "you will be assured of several important things —

**First** — You will have the benefit of competitive bidding, on an equal basis, among roofing contractors.

**Second** — You will receive the Barrett Inspection Service *without charge*.

**Third** — You will have a roof that is guaranteed by a Surety Bond to be free from maintenance expense for the guaranteed period.

**Fourth** — You will have a roof for which there is positively no "or equal."

### The Surety Bond Guarantee

THE Barrett Company is the *only* Company that has enough confidence in its roof to put back of it a Surety Bond. In fact, no other concern will guarantee a roof for so long a period, much less furnish a Surety Bond.

The Surety Bond is offered on all Barrett Specification Roofs of fifty squares or more in all cities of 25,000 or over, and in smaller places where our Inspection Service is available. It is issued by the U. S. Fidelity & Guaranty Company of Baltimore, and exempts the owner from all maintenance expense for the life of the Bond.

Our only stipulations are that the Barrett Specification dated May 1, 1916, shall be strictly followed and that the roofing contractor shall be approved by us and his work subject to our inspection.

These roofs take the base rate of insurance and cost less per year of service than any other type of "permanent" roof.

When you have written the details of the Barrett Specification Roof in your contract, *stop there*. You will always be glad you didn't insert "or equal."

### Important Notice

The Barrett Specification 20-Year Bonded Roof represents the most permanent roof-covering it is possible to construct, and while we bond it for twenty years only, we can name many buildings carrying this type of roofing that have been in service over forty years and are still in good condition.

For those who desire a lighter and less expensive roof-covering, we recommend the Barrett Specification 10-Year Bonded Roof.

Both roofs are built of the same high-class waterproofing materials, the only difference being the amount used.

Full details regarding these Bonded Roofs and copies of The Barrett Specification sent free on request.

### The Barrett Company

NEW YORK	CHICAGO	PHILADELPHIA
BOSTON	ST. LOUIS	CLEVELAND
CINCINNATI	PITTSBURGH	DETROIT
NEW ORLEANS	BIRMINGHAM	KANSAS CITY
MINNEAPOLIS	DALLAS	NASHVILLE
SYRACUSE	SEATTLE	FLORIDA
ATLANTA	DULUTH	SALT LAKE CITY
BANGOR	WASHINGTON	JOHNSTOWN
LEBANON	YOUNGSTOWN	MILWAUKEE
TOLEDO	COLUMBUS	RICHMOND
LATROBE	BETHLEHEM	ELIZABETH
BUFFALO	BALTIMORE	

The BARRETT COMPANY, Limited  
MONTREAL TORONTO WINNIPEG VANCOUVER  
ST. JOHN, N. B. HALIFAX, N. S. SYDNEY, N. S.

**Barrett Specification Roofs**

Bonded for 20 and 10 Years



# Manufacturers' Catalogs and Business Announcements

## CATALOG REVIEWS

AMERICAN FACE BRICK ASSOCIATION, 110 South Dearborn street, Chicago, Ill.

"The Home of Beauty" (8 x 11 ins.). 72 pp.

One of the most ambitious forms of industrial expression in amplifying the proper and less expensive uses of its product is this collection of fifty small brick house designs issued in book form. It is interesting to know that in a competition authorized by the above association there were three hundred and sixty odd competitors for the honors conferred by the jury of award. These judges were chosen from the field of small residence designers for their familiarity with the problem. The exacting program of requirements likewise had to be drawn up with a close knowledge of the essentials of house planning.

The product of elimination—the ten prize designs and forty others, specially chosen—are shown by sketches and plans, together with two valuable articles for home builders in these pages. A versatile handling of the major material—face brick—and an up-to-the-minute viewpoint as regards plan bring before the architect an assimilation of the elements that have been dwelt upon by patrons, designers and judges.

THE GENERAL FIREPROOFING COMPANY, Youngstown, Ohio.

"General Fireproofing," Monthly (8½ x 11 ins.). 14 pp.

The house organ of the above concern known for the last four years as "General Fireproofing," and circulated in the interests of its agencies, will now be pursued by the parent organization as its own. A recent issue shows two articles on the architecture of country houses in which stucco is the medium. Of these, one is an actual description and the other approaches the subject in an analytic vein, which enhances the interest. Two articles are devoted to fireproofing and planning of the home. An attractive frontispiece and a busy editorial page leave little of the contents for the usual manufacturers' propaganda. The editor states that the majority of pages will be devoted to promoting good will and in dispensing information without advice. One humorous page and a half entitled, "Walls That Stand," an epic on the founding of Rome, provides enough light text to leave the reader in a genial mood.

"GAS AGE," 52 Vanderbilt avenue, New York, N. Y.

Special Issue. "Heating."

House heating with gas, which makes it possible to automatically heat the home from October to May without any of the bother of ashes and coal, is fully described in a recent issue of the above journal. Gas for fuel may be used with any stand-

ard system of heating such as steam, hot water, vapor vacuum or warm air. Installations of each kind are described and illustrated, and the accompanying data gives the necessary engineering information and comparative costs for the architect to form reasonable conclusions. In addition to this the various systems by which gas is sold in the United States are described. These are the block system, the secondary rate system and the special rate system, which make it possible to use gas at a lower or only slightly greater cost than coal, depending on the system used.

## ANNOUNCEMENTS

W. Whitehill, architect, announces the removal of his office to 12 Elm street, New York City.

Arthur B. Heaton announces the admission to partnership of E. Burton Corning for the practice of architecture, with offices at 210-214 Maryland Building, 1410 H street, Washington, D. C., under the name of Arthur B. Heaton, architect.

Raymond D. Weekes has opened an office for the practice of architecture at 501 Bloomfield avenue, Montclair, N. J., and will be pleased to receive manufacturers' catalogs and samples.

Edward C. Van Leyen and Edward A. Schilling, architects, and Henry J. Keough and Robert A. Reynolds, engineers, announce their association under the firm name of Van Leyen, Schilling, Keough & Reynolds, with offices at 556 Cass avenue, Detroit, Mich.

Edgar and Verna Cook Salomonsky have opened offices for the practice of architecture at 368 Lexington avenue, New York City.

Howell & Thomas, architects, announce the removal of their offices from 2032 Euclid avenue, Cleveland, Ohio, to 1400 Euclid avenue.

Ellery K. Taylor announces the opening of an office for the practice of architecture at 1627 Sansom street, Philadelphia, Pa. Manufacturers' samples and catalogs requested.

Fulton & Taylor and Paul T. Cahill announce the formation of a new partnership under the name of Fulton, Taylor & Cahill, architects, and the removal of their office after Apr. 1, 1920, from 631 Hippodrome Building to 8120 Euclid avenue, Cleveland, Ohio.

## DRAFTSMAN WANTED

Capable of making working drawings from preliminary sketches and with knowledge of perspective rendering. Apply to W. B. V., THE FORUM.